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MEDICAL ASPECTS OF THE NORMANDY INVASION*

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ONE year ago operational plans for the invasion of Normandy by the Third Canadian Assault Division were completed. Officers of the divisional headquarter had returned from planning rooms at *H.M.S. Vectis*, to the new divisional headquarters at Cranbury House, four miles south of Winchester. This magnificent old Adam house was reputed to have once been the home of Sir Isaac Newton. Perhaps the very fireplace around which we used to sit was the same one before which Sir Isaac had fallen asleep only to awaken and find the manuscript of his *Treatise on Physics* in a diaphanous ash on the hearth where it had been dragged by his dog Diamond. The only remark of the great scientist on that occasion is said to have been: "Alas, poor Diamond, little dost thou realize what thou hast done." It was in this comfortable atmosphere, in what was to be our last headquarters in England, that we awaited the proof copy which represented three years of concentrated thought, study, and effort, for many of us. Were we to be dog, and burn it? or scientist, and re-write it?

These were not the first plans which we had produced for a beach assault by a complete division. The day on which I joined the division (July 26, 1943) the staff had already begun work on invasion plans. It was obvious that we were getting down to a job of work, and it was equally obvious that Winston had appeared at the War Office and said: pray, prepare for the invasion of Europe—which in Churchillian translation to the army means, "get on with it!"

Planning operations on such a gigantic scale impressed us at once with three important facts: First, that we, as a small body of officers, were entering a tough school in which circumstances were to be our only guide, and the timetable was to be heavy and forced. Second, that we were destined to be the instructors of thousands. Third, we were undertaking the planning, not only of the greatest military offensive, but the greatest combined Navy, Army, and Air-force offensive, and therefore the most spectacular and far-reaching adventure yet attempted by man in the history of the world. We found ourselves, as Dickens said, "living in the best of times, in the worst of times, in the age of wisdom, in the age of foolishness, in the epoch of belief, in the epoch of incredulity, in the season of Light, in the season of Darkness, in the spring of hope, in the winter of despair"—we had everything before us, we had nothing before us; we were all going direct to Heaven, we were all going direct the other way: in short, the only thing of which we were quite certain, was that when the sun went down on D-day, the Third Canadian Infantry Assault Division would be sitting on its objective, wherever that may be.

Maps were unrolled. We examined the north-western coast of Europe from Denmark to Spain. We digested that part extending from Dieppe to Cherbourg. The two little insignificant bays in front of the plains of Normandy, leading via Caen, Falaise to Paris, became our special care.

The first plans to be produced were for a complete frontal assault by an infantry division on the harbour, town, and beaches surrounding Dieppe. In this way full advantage was taken of the lessons learned (and undreamed-of dividends were drawn by us) from the heroic action of our sister division. These

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plans, in which every officer and man, with every rifle and gun, had his place and appointed task, were produced in approximately twenty-one days, under conditions of absolute censorship and security. Whether or not Hitler ever received a copy of these plans as a preliminary sedative, I am not prepared to say. Undoubtedly such things as misdirection were being undertaken in a very big way. As the intelligence reports came in, and one pin-pointed the preparations of the enemy along the coasts of France, one was reminded of the ancient Russian fable about the cat which ate its master's meat. As the master lectured, the cat kept on eating; so as we continued to drop persuasive pamphlets, this insidious enemy of ours continued to prepare for our total destruction. Now, however, we had turned serious. In keeping with security measures, and in order to make the acquaintance of the officers of the other arms with whom we were to be associated, skeleton staffs moved into accommodation at headquarters for the direction of operations on the western front. Here we worked day and night, producing plans for a full scale divisional combined operation in which troops would actually take part in a beach assault.

In the meantime, the training of the units and personnel of the division was stepped up, and arranged in accordance with the future tactical problems that units and individuals would be required to undertake. The division was despatched to the sea coast by brigade groups for training in assault landings. Each unit was obliged to set up its own assault course, consisting of obstacle race courses and rope ladder ascents to the height of forty to sixty feet. Enthusiasm knew no bounds; at some messes one had to climb a rope to the required height, make an overhand trip horizontally, and descend a rope ladder, in order to reach the bar. This was the common obligatory method of entering the headquarters of different units.

In addition to allocating medical units and elements of medical units to special tasks, and fitting them into assault craft in support of, and along with, combatant forces, a constant survey was made of personnel with regard to suitability of personality, experience and stability for the job in hand. Every medical officer had to be a commanding officer, in addition to being an all-round capable doctor. During the planning of this first exercise the divisional headquarters staff had the additional responsibility of moving the division long distances in a three-way move. First, by trains to combined operation training centres in north-west Scotland. Second, return by train from Scotland, and finally, to a new training area in the south of England. It was soon found that the job of feeding, quartering, and servicing the division, which was increasing in size to almost double its ordinary strength, was incompatible with the new job of training and planning. Consequently, it was arranged that the divisional staff be practically duplicated by increment staff appointments. My own staff was increased from one Major, D.A.D.M.S., to five officers of Major rank as assistants.

The pictorial magazines have carried a variety of illustrations covering the assembly, concentration, and marshalling of a large military force. As our troops returned from Scotland they were assembled in positions in the south of England which would render subsequent concentration and marshalling procedures less difficult. To facilitate these movements of troops, large camping areas were set aside for the assembling and concentration of a force. In addition to these camp sites, road margins on all roads leading to the seacoast, were reserved. This involved widening most of the roads 3 to 4 feet on each side, with reinforced concrete. Spaces along the road large enough to accommodate a vehicle were marked off with large bands of paint, and each space was given a number. This preparation applied to almost all roads up to eight to ten miles inland, and enabled the whole area to be allotted to successive embarking forces with the complete assault vehicle establishment. Immediately prior to embarkation, the vehicles and accompanying personnel occupied these sites in the marshalling process, both for combined operation schemes and previous to D-day, when in some cases they remained for as long as forty to fifty days, prior to going on board.

As the preparations for our first large scale exercise progressed the naval force assigned to the Third Canadian Assault Division was assembling along the coast at their stations, and, believe it or not, this not inconsiderable force of men and ships of the Royal Navy was required to temporarily abandon naval tradition

and to come, almost, but not completely, under command of a military division from no less a place than the Dominion of Canada; a matter of some moment, even in the course of such a general revolution, in which the scrapping of closely guarded conventions was, fortunately, not uncommon.

Curiously enough, this exercise, which was witnessed from the land side by hundreds of high ranking officers from all services of the Allied armies, was most successful, in that having obtained as Cæsar said, "a suitable wind and tide at one and the same time", it carried through on schedule to completion. We even had some support from the air force during the landing, the absence of which on a later scheme gave rise to a typical Canuck "crack" much to the amusement of a certain very high ranking British officer. On this occasion, clouds caused the cancellation of the air co-operation, just as the landing was about to begin. While getting into the assault craft, preparatory to being cast off, one young and rather frightened soldier was giving his "Mae West" an extra lung-full of air; his sergeant, who was leaning over the rail beside the distinguished visitor, gave this unusual order in a loud voice. "Blow her up tight, buddy! it is the only bloody air support you will get today".

Among many other things that had to be practised and learned by large groups of men, were the code names for officers representing the various services. Medical officers were known as "starlight"; artillery officers answered to the call "fetch seagull". The first day that the artillery call went over the air at sea, the signals officer returned the naïve reply "That he was frightfully sorry, but he hadn't seen a seagull all day." Which only goes to show how far we had yet to go with our training. Exercise "Pirate" included a full scale artillery shoot from the sea with "rockets" and other infernal weapons in support of the infantry landing. When the troops came ashore they encountered real obstacles and had to pass through them, to the accompaniment of whistling bullets and H.E., after which they advanced inland to the same distance as they would be required to go on D-day, over much more difficult terrain.

This type of training was only a sample of what the troops of the Third Canadian Assault Division had to do over and over again during the winter of 1943-1944, until the final exercise, in which every man and gun went to his exact unit and craft position, over a strange beach, to a new objective which was almost an exact replica of the beach and terrain to the objective in the vicinity of Caen itself.

Immediately following the first exercise, some of us were despatched to London on a planning course. This course, of a concentrated two weeks' duration, had already graduated a few classes of arm-chair planners. The present class was made up of British soldiers from commando operations; American soldiers from Pacific theatres, where combined operations were becoming a commonplace; and Canadians just up from putting over the first successful (still unbelieved) field artillery shoot from landing craft at sea. We listened patiently to the West Point, Sandhurst, and War Office boys, for two weeks, and then offered to sell them our answers to their problems for a good "stand-up bottoms-up" round at the bar. They bought them up! Such was the state of inter-Allied, and military caste warfare in November, 1943. Shortly after this, this planning school staff decided that the real lessons were being taught in actual operations, and with much credit to themselves, the staff left for active service and the school closed down.

About this time the surgeons for the beach assault force were chosen from a group of adventurous and exceedingly capable fellows, and the medical units were selected for the Beach Group under our command. This force had now grown in size to equal our division and in addition to two C.C.S.'s, four field dressing stations, four F.S.U.'s, two surgical teams, a casualty evacuation post, a company of medical pioneers, and a platoon of D.U.K.W.'s for medical purposes, there were: assault engineers, an anti-aircraft regiment, a balloon barrage company, an anti-tank battery, a D-D tank regiment, four infantry battalions, including the famous regiment of King's, and last, but not least, that elusive reconnaissance regiment known as the Inns of Court, commanded by none other than the famous legal character, Colonel Bingay, himself.

The disposition of medical units in the assault force was by this time taking form in the mind of Colonel Roddy Cameron, A.D.M.S. of the 3rd British Division, and myself. We had been worrying considerably about the transport of wounded from the beach medical installations, *i.e.*, the casualty evacuation point, to the L.S.T.'s which were to be converted to hospital ships,

for the return journey to England. On this point, due to the inventive ingenuity of our American cousins, and the resourcefulness of the American Navy, we were all treated to a pleasant surprise in medical operations. Those interested parties, who were largely of exalted rank, were given a war office treat of a special train, private compartments and diner, and were whisked away under war-time security arrangements, to a lonely beach on the south coast of Wales. Here, in perfect comfort, we were taken down to the sea in D.U.K.W.'s, rolling and sailing away over six foot waves to an indiscernible foggy destination, where we were casually driven up a ramp between the open jaws of an L.S.T. and then stepped out of our amphibious wonder on to a perfectly dry deck to enjoy a cup of tea. For the next two hours we witnessed D.U.K.W.'s arriving with loads of stretcher cases, which were driven aboard dry, hoisted aboard by cranes, and taken aboard by every conceivable and efficient method not before known to man. The only decision which we had now to make was how many D.U.K.W.'s would be needed for our medical purposes. The lend-leasers simply said: "Well, how many?" We decided on 66; two platoons to a corps (33), or one platoon to a division. The answer was "O.K." and our major problem was temporarily solved.

We all made quite certain that the troops under our command would be adequately trained for the task which lay ahead. To this end, and to ensure that a high standard of health and morale would be maintained in the division while the men were undergoing arduous training, during which they were exposed to the elements at their worst, it was ensured that the various units would have the best possible rations, quarters, and relaxing entertainment. The division continued to occupy the most attractive, comfortable quarters, and continued to train over the best training areas in England. Arduous and dangerous as our future task appeared at the time, it would be a serious mistake to think that no other force wanted our job. I think I am safe in making the statement that every other division in the British Army sought after it, and no doubt every spirited divisional commander did his utmost to get us out, and his own division in. We held on, however, and the Third Canadian Infantry Division became assault and street fighting specialists.

Exercises continued, the medical services taking part in most of them. On one medical exercise, casualties were collected from inland, and on the beaches, transported seaward in D.U.K.W.'s to L.S.T.'s, taken on a short sea voyage, disembarked, re-loaded on hospital trains, and despatched to hospitals inland. In this way, our whole system was exercised and proved to be in workable condition.

On February 2, 1944, the planning staff moved to London, there to join the Army, Corps, and other divisional staffs to complete all final arrangements. During our six weeks there, old Jerry continued to edge us on with vexatious bombing attacks and we often went to sleep to the tune of ack-ack, bombs and fire-gongs, and breathed ashes and fire after the manner of Mars. When army and corps staffs extracted all the information they could from the divisions, we each returned to our own planning rooms. The Third Canadian Division took over a building on the Isle of Wight that the 14th Canadian Field Ambulance had renovated from a very derelict mansion into a rather fine hospital, in which to accommodate the Brigade planning groups. The divisional planning staff occupied yachtsmen's homes along the shores of the Solent, and went to work at *H.M.S. Vectis*. It was pleasant and exciting here in the midst of naval and military preparations, with spring in the air, and the ever-changing tides and currents of Southampton waters lapping one's very doorstep.

From here, to gain our last breath of the English countryside at its best, we returned to Cranbury House, where we entertained many distinguished visitors, including His Majesty the King, our own Prime Minister Mr. Mackenzie King, the Honourable Mr. Vincent Massey, and General Eisenhower. General Montgomery was, by this time, considered to be one of us. We set our offices up in the surrounding gardens, and the office staff, like all the troops of the assault force, took to the open with the minimum of assault equipment and vehicles.

Napoleon is credited with the statement that an army moves on its stomach. There are many amendments to this statement when it is applied to a modern army, which moves on rubber tires, or on petrol, or by H.E. shells, or

by a number of other things, running into thousands of tons of required supplies. From the standpoint of medical supplies, we raised our establishment to three times what the staff tables called for, for a required number of casualties, and prepared for three times the casualties that we, in our sober moments, expected to have, thus ensuring a margin of 900% insurance.

With regard to supplies other than medical, there is a rumour that when the lists were prepared from staff tables showing the tonnage of supplies of all types required, and presented to General Eisenhower, this gentleman, a man of few words, which typifies the modern American, simply wrote X3, and returned the lists for action.

To even the most casual observer at large in the South of England, such things as petrol pipe lines, large supply dumps, etc., would be noticed, and during the hours of darkness, traffic on all railroads leading to the coast increased tremendously. The motorist who had enough petrol to drive from Southampton to Birmingham, would perhaps notice, (but not mention) that both sides of the road for most of the distance was occupied by Nissen huts end to end, filled with ammunition. At the end of the first week following D-day, most of this material was sitting in neat piles in the wheat fields of Normandy.

As D-day approached, except for the anxiety expressed by the Luftwaffe in making an increasing number of visits by night to our area, (he did not dare come in the daytime), the south of England was calm and quiet. The troops were quite concentrated in the camps, duties were suspended, and briefing was going on in a graded way, from commanding officers to selected N.C.O.'s. The men were briefed on board ship while en route. Everyone was behind barbed wire, and most people remained there, including the residents.

As A.D.M.S. I told the story to the fourteen commanding officers under my command as soon as briefing commenced, and advised them to brief their own junior officers and N.C.O.'s, who in turn, told the story finally to the men. During this time, from April 1 to May 27, 1944, the troops were being fed on what is known as the "hotel system", that is, by centrally placed kitchens which were not operated by individual units, but by Southern Command in our particular case.

On May 27, loading commenced. Most of the troops had been aboard on exercises, and they had developed a routine for eating and sleeping while guests of the Royal and Royal Canadian, Navies. The headquarters staff moved to quarters at *H.M.S. Vectis,* or to the headquarters ship, where we were still connected to land by telephone. Most of us had a happy time visiting the various ships, frequently in the Admiral's barge, when we were piped aboard with full ceremony, even if we were only going to the bar (for a double Scotch at 6d.).

D-day was known to a very few. It was also known that if it were to be postponed 24 hours from the 5th of June to the 6th, that this might happen for only three successive days. That is, the 7th would be the final twenty-four hour postponement. However, provision for a two-week or twenty-eight day postponement had been made. On the evening of the 5th, after one 24-hour postponement, the captain of the ship called the attention of some of us who were sun-bathing on deck, to a couple of distinguished Army and Corps officers, who were coming aboard in full web equipment with packs, revolvers, and tea cups attached. As it took about three sailors each to get them on, up, and off the gangplank, the captain suggested that such a colossal effort might indicate that the war was on. Later, while we were all assembled in the bar, it was announced over the loud speaker that when the ship weighed anchor, no one would remove clothes or life-belts. We thought we might be going somewhere, particularly with the little touch about life-belts. Soon after, the anchor chains rattled, and we sailed away, the answer to the old riddle, What comes steaming out of Cowes? The headquarters ship glided silently and very solemnly down through the ships as anchors were being hauled aboard and we headed straight for Normandy, the tip of the spear-point, pointed at the heart of Germany.

During the 24 hours previous to H-hour, the Navy and Air-force accounted for a great many E-boats in the invasion waters. By this action, the minds of the enemy naval service were definitely turned to their own immediate economy, leaving us fairly free to come in and scrutinize our little bays from

close up. The battleships, cruisers, and monitors were the first to open up on their targets. It is a pleasant sound to hear fifteen-inch guns firing at sea in the early morning. We were directly in front of them, and got the full effect of the thunder from the powerful guns and the weird scream from the skies as the shells went overhead. The headquarters ship anchored in the early morning in position about 6,000 to 7,000 yards off the beach, and the troopships took up positions alongside as planned. There was a slight delay here, while some of the L.C.T.'s carrying assault tanks and artillery, buffetted the sea to get into their proper lanes. The engineers could not begin their work of obstacle clearance until after the bombardment of the beach defence positions was completed. In the meantime, the tide, over which man has not yet succeeded in exercising any control, was rising at the rate of about one foot each twenty minutes. At this stage of the game, things appeared to be going a little awry for us. However, the big guns of the navy boomed away, and the flashes all around us with whining and screeching overhead, gave us great confidence, as most of it was our own doing. The L.C.T.'s bearing artillery and assault engineers soon passed us in fine formation and we closed in behind them. Soon all hell broke loose from the guns of all our field artillery firing from their positions in the various craft. It was obvious that it was very unhealthy in the beach area now, and our ship shook violently from the vibrations transmitted through the water as a result of the shells and rockets lighting on the waterfront. Fires broke out everywhere along the beach. The assault troops were now passing in formation on both sides, taking quite a beating from the high sea which was running. D.D. tanks and the small two-men subs were dotted all around us, everyone trying to join in the fun.

THE ORDER OF BATTLE

The disposition of the troops by units at "H" hour is of interest. The 7th Canadian Infantry Brigade, attacked on the right with two battalions up, the R.W.R. on the right, and the R.R.R. on the left, with the Canadian Scottish in reserve. The 8th Canadian Infantry Brigade attacked on the left with the Queen's Own on the right, and the N.S. on the left, the Chaudières in reserve. The 9th Canadian Inf. Brigade was the reserve brigade and landed on directions of the G.O.C. in accordance with requirements on land. The medical officers of the battalions, with their regimental stretcher bearers, landed with the regimental headquarters, and in support of them went a section of a field ambulance, consisting of one officer and 18 men, with special medical packs containing plasma, morphine, shell dressings, sulfanilamide powder and cramer wire splinting. These sections were to keep contact with the regiments on landing and to follow them inland.

The immediate follow-up medical troops consisted of four light sections of the Field Dressing Stations from the beach groups, which were to establish Beach Dressing Stations at previously determined points on the beach, one thousand yards apart. These units landed at H plus 90 minutes. Three medical officers, of Major's rank, were sent in one each beach at this time, as co-ordinating officers. One Major from the field ambulance which landed troops on each beach. These were: Major Norton, from the 14th Can. Fld. Amb. and Major Baker, from the 22nd Can. Fld. Amb. Their duties were to keep contact with the elements of their units which had landed, make a reconnaissance of the location of the Advanced Surgical Centres (A.S.C.), as selected on the maps during the planning, and finally, to report to my representatives on the beach. Major Chapman and Major Wolfe, of the 33rd and 1st Field Dressing Stations, were responsible for co-ordinating the beach dressing stations and the medical pioneers during the early hours and making a reconnaissance of the sites for the Advanced Surgical Units which had been selected previously in the planning from air photographs. The third member of each of these groups was my representative on my immediate staff, Major Proctor on the right, and Lieut.-Col. MacPherson on the left, who were to collect information from the other Majors, and keep their eye out for my landing craft, joining me at the main beach signal station as soon as I landed. In this way we had the position (from a medical standpoint) well sized up before the medical units came along with their vehicles and heavy equipment at H plus 4 hours. Once the battalion headquarters reached the shore, familiar voices by radio kept us continuously informed of the progress of the battle in each battalion. It was

remarkable with what ease one could discern the areas where our boys were having the greatest difficulty, and for me personally to judge where casualties on the beaches would be heaviest, and where our efforts for early assistance would be concentrated. Fire from naval guns was on direct call from the battalion commander. We amused ourselves between reports trying to judge where the naval heavies were landing, and which buildings along the beach were burning more fiercely. At this time it was probably as well that we did not know some of the largest fires were resulting from the destruction of a few of our own self-propelled (S.P.) artillery. In our state of psychology we did not believe in failure or set-backs of any kind.

As soon as our main beach signal station was organized, a brigadier took over command on shore and the G.O.C. and his satellites set off for shore. This manœuvre was expedited a little by the fact that we had received a few wounded aboard the headquarters ship, and our dining room, where we ordinarily had morning coffee (and which was now converted into an operating room) was emitting a steamy blanketing perfume, the like of which only spilled fresh blood can produce. No one wished to stay for lunch. The Surgeon Commordore was directing the craft carrying wounded to various ships for treatment by flash signal from the headquarters ship. General Kellar stood behind the driver of our L.C.P. and directed his and our destinies over the mined obstacles on the way in; the skill required here was to place one's boat on the top of a swell in a clear area so that when you were in the trough of the wave the mines would be all around your craft but not under it. The last few yards of this trip was by far the most perilous sea voyage I have ever experienced. We were so busy looking for the tops of two-quart champagne bottles (which were filled with T.N.T.) sticking out of the water that we did not mind what came from the shore to meet us. Fortunately the closest we came to one of these contraptions was about one foot, which is a pretty safe margin if the sea gives you another kick in the right direction. As soon as the craft touched bottom, we made a semi-dry speedy landing in front of Berniéres-sur-Mer, and had a rather confused look around us.

At this time I had already learned that the situation on the right beaches was well in hand in every way; the reports from the beaches on the left were confused, so as soon as I had parked a few personal belongings behind a knocked-out tank, which served as a temporary headquarters, I set off to meet Lieut.-Col. MacPherson. One was impressed by the lack of confusion. Those who had work to do were doing it, and those who had arrived ahead of their job were patiently waiting well out of the way. There were singing and whistling noises with a few crumps and bangs about, but our troops had been taught that these would be due to our efforts, and it was surprising how mass mentality was satisfied with this explanation. Actually, our engineers were already exploding mines on the beaches so that one did not really know what was going on, and had no time to enquire or worry about it. Lieut.-Col. MacPherson and Major Chapman were contacted immediately on the east beach, each with a new Mauser rifle at the slung position and looking moderately happy. They were minus a jeep and Major Baker. The former was readily accounted for as it had run into a mine and had made contact with an H.E. shell. I was not satisfied with the rather hesitant answers given concerning the whereabouts of Baker. They reported that all casualties were in at the first Beach Dressing station, and that the second, and more distant one, could not be approached with safety. I sent them to get the jeep out of the tide and be prepared to go down to the more distant B.D.S., and started off on foot. The first B.D.S. was functioning well under the protection of the sea wall and had some ninety odd wounded in, including compound fractures, heads, chests, and abdominal injuries. Most of the walkers had been despatched in small craft.

As one made one's way down to the farthest town of St. Aubin, where the farthest B.D.S. was known to be, there appeared to be a gap, where no one was crossing. The reason was quite obvious as things were bursting in that quarter, and a few of our S.P.'s were still creating an unhealthy situation themselves, as a result of internal explosions. This area had to await further investigation. This was the first occasion that I had been without transport since arriving in England three and one-half years before, and the walking was not too good. However, I made my way down to the west beach and contacted the B.D.S., from where, through glasses, I could see that everything beyond was functioning well. On my way back to the main signals station I met MacPherson and Chapman in their recovered jeep which had four flat

tires, had been generously penetrated by shrapnel and as generously splattered with blood, brains and other human debris. As Major Baker had been the only other passenger of this luckless vehicle I asked no more questions while they drove me to the headquarters of the beach group. Here priority claims on D.U.K.W.'s and L.S.T.'s for wounded were officially registered, and I proceeded through the burning village to the orchard where the position of our first headquarters ashore had been agreed upon. Progress forward was barred on the road just at the entrance to this orchard as an unreduced enemy gun position on the hill a thousand yards ahead commanded the road. While the navy and our tanks got him in their sights, I had a sandwich, coffee and a cigarette in my first rather hastily prepared slit trench. In a few minutes a barrage went down on the gun and traffic on the roads moved away inland. Reports were received from all the battalions. The medical officers were apparently all O.K. except Kirsch, of the Queen's Own Rifles, who had been wounded in the leg, but was carrying on. So far the medical services were functioning 100%.

Our chief concern was to get the Advanced Surgical Units open and operating. Transport was urgently required. In the planning, vehicles were due to land at H plus 4 with the equipment for the Advanced Surgical Centres, and along with these were to come ambulance cars for transport of wounded. The wind and rising sea delayed the landing of these vehicles. However, they did come, and by ten o'clock on the night of D-day these Centres were functioning. Many of the more seriously wounded were carried in by hand, and we soon had ambulances and D.U.K.W.'s bringing in all the serious cases from the Beach Dressing Stations.

In England, there had been much discussion with regard to where plasma should be given, and at what level major operations should be undertaken. We made sure that we had the professional skill required, and that plasma was provided right into the front line. The only order the medical services got from me was: "bring them back alive". This order was carried out with considerable despatch. To my knowledge, no wounded men lay on the battlefield without medical attention on the night of D-day. During the evening the seas and skies were subjected to rather more than interested inspections for signs of moderation in wind and tide. From all weather reports there was no hope of abatement in storm conditions. For this reason the surgeons were given the go-ahead signal on all imperative operative cases, for 48 to 72 hours. There were 93 major operations done in the following 48 hours, and every one of these was a life-saving job. Most of the abdominal and chest cases were clean through-and-through rifle wounds. Extremities were rifle and H.E. shell. Fortunately for us the enemy did not get a chance to use mortars against us during the landing.

Capt. Cowan, a medical officer of the 22nd Fld. Amb., who had landed with his section in support of the Queen's Own Rifles during the day, suffered a ruptured gastric ulcer at 11.00 o'clock p.m. and carried on evacuating casualties for a couple of hours, during which time he drank a tin of self-heating cocoa to relieve his pain. He was operated on at 4.00 a.m. and made a steady convalescence in a tent with about thirty other postoperative patients. During the first week bombs fell within a few yards of this convalescent tent, which made it difficult for the staff to keep it in place. The canvas was holed with shrapnel and rifle bullets. Snipers were active in the trees and hedges for the first three days, making it difficult to approach the entrance with any sort of a dignified air. In spite of this, the postoperative progress of these patients was good, and when asked about their impressions during this week, at a later date, very few of them had any recollection of being under fire or having had a very miserable experience at all.

Prospects of despatching stretcher cases to England were not good on D plus 1 as the sea was very rough and few ships were able to unload. These were the worst conditions at this date that had been experienced at this beach in 60 years. In the meantime casualties were coming in from the sea, the beaches and inland. Preparations were accordingly made to hold any number of casualties on land; both A.S.C.'s were instructed to take over more buildings. The site for the C.C.S. was chosen at Reviére. Lt. Col. Healy, of 32nd C.C.S. and myself, made an exceedingly rapid survey of a site at Tailleville because we were greeted there with a shower of machine gun bullets from the surrounding grain fields. While looking over the site in Reviére we were stopped

by "Monty" who inquired what we were about, as he posed for the inhabitants of the town to have a real good look at the conquering general.

This medical site at Reviére was carefully chosen, and it proved to be a particularly good one, as it later accommodated 2 C.C.S.'s and the 77th Gen. Hosp. It was very centrally located as far as our division was concerned. The 14th and 22nd Fld. Ambs., which were evacuating the forward units, were both less than four miles away, and the 23rd Fld. Amb. in reserve, was about half a mile down the same road.

The first L.S.T. was ready for casualties on the afternoon of D plus 2. By this time the beach dressing stations had been completely cleared and all urgent non-operated cases were loaded on this first L.S.T., which finally took about 362. One could not help but be impressed by the fine condition of the casualties as they were put aboard, from ambulances and D.U.K.W.'s. From this time, that is, D plus 2 onward, our whole medical set-up was operating smoothly from the battlefront to the hospitals in England. L.S.T.'s were loaded regularly at the West Beach, and on D plus 8 hospital ships appeared lying off the beaches. The hospital ships were proved to be obsolete for this kind of use, as they had to stand too far out at sea, and loading from small craft was by ancient and crude methods. After D plus 2 casualties were frequently evacuated from the front lines directly to the loading craft on the beaches. On one occasion a soldier from the R.W.R. was injured at Bretteville l'Organeuse, thirteen miles inland, and he was having his wounds attended in an L.S.T. within seventy minutes.

On D plus 3, evacuation to C.C.S.'s at Reviére began. The 14th Can. Fld. Amb. was located at Pierrepont and was evacuating the 7th Can. Inf. Bde. The 22nd Fld. Amb., with sections of the 23rd Fld. Amb., were located at Beny-sur-Mer, and were evacuating the 8th and 9th Can. Inf. Bde. All casualties from the forward areas were now directed to the C.C.S.'s at Reviére. Here casualties were sorted for immediate operations, immediate evacuation, or holding temporarily in C.C.S. Those for evacuation were sent in convoy to the Casualty Evacuation Post, on call, when ships were available. This situation in the rear areas prevailed until D plus 11, when evacuation by air commenced from St. Croix-sur-Seulles.

During the first week our two main concerns were the intentions of the enemy in front of us, and the conditions of the sea behind us. Every night patrols were out testing enemy strength in front, in order that adequate defence against a serious threat from counter attacks, could be prepared. Conditions at sea determined whether or not supplies would be landed in quantity. The officers at Headquarters were anxious for information on both these points, particularly in the evening, when things usually got a bit tense between the hours of dusk and total darkness. During these hours, enemy patrols would come right in amongst us and snipers, who ordinarily remained at least in the hedge on the other side of the field, were now quite liable to be standing beside one. Every evening in headquarters compound, as soon as it got dark, the first local shot was a sign for a general feu-de-joie from our defence platoon, and for the next half hour everybody seemed to be shooting at everybody else. Being unarmed, I usually sat this period of excitement out in my slit trench, smoking a free cigarette.

From a tactical standpoint, inside the bridge head, there still existed a couple of festering sores. The radar station behind Tailleville was still unreduced. From here, heavy machine guns could lay down a concentrated shower of bullets on any point up to 4,000 yards distance. The enemy could, if he so desired (and he frequently did) accompany this nuisance with a few rounds of mortars. They also had one of those pop guns from which a shell lands at your feet, then you hear it coming, after which you hear the report from the gun; this being the usual succession of events in complete reverse. There were seventy odd German naval and air-force men in here, and between trying to direct our battles in the exact voices of some of our commanders, over their radio, they made a nuisance of themselves with their tiresome toys, particularly to the 22nd Fld. Amb. and Divisional H.Q., who were trying to live peaceably at Beny-sur-Mer. Capt. Coleman received mortar wounds in his right knee while working at this location of the 22nd Fld. Amb. On the morning of D plus 1, when we moved up to Beny-sur-Mer, my driver swung into an attractive orchard, and we were unloading a few personal things under an apple tree, where we

intended camping that night, when we became the target for a sniper in the hedge. We went to ground very quickly, my driver returned fire with a couple of magazines full from a Sten gun, while the defence and employment platoon came to our rescue. We left promptly and did not get our equipment from this position for 48 hours, as it was covered from an excellent sniper hideout. This spot was finally surrounded and the occupants were wiped out, along with a number of others who had been molesting us in this cowardly fashion. Curiously enough, our efficiency here had a peculiar sedative effect, as we did not have another sniper bullet in our H.Q. in any of the positions we occupied after that time. One has to establish a reputation for firm dealing in a war zone.

The second chronic ulcer which troubled us was a naval gun along the coast, in the direction of La Havre. This baby, a 16-incher, dropped eggs at random on our bridge-head for upwards of six weeks. Much to our amusement, his chief interest was the vicinity of Army headquarters, which quite naturally he could not reach. On one occasion, he did succeed in landing one in "A" mess at Army H.Q. As it did not cause any casualties, but destroyed all their whiskey, this provided a good laugh for a few days. From this same source along the coast, our ships received some attention, and we had a number of naval casualties every night. They were also sending out their two-man subs by moonlight. The old sea dogs lay low for a few nights, and then nabbed thirty or more at one netting. Our naval boss used to look us up for lunch every day, and he never failed to have a loaf of white bread under one arm and a bottle of Scotch under the other. Although we asked him "What he was going to do with all the bread?" the proportion never changed, as it was apparently decided by the navy, (and therefore not subject to change), that the proportion was correct. One day, about D plus 3, when we were feeling a bit low because our namesakes had not captured Caen, he made the remark quite casually that we "Mustn't worry, because the naval plan called for the navy to operate our beaches to support a two-year campaign from that base". We had held long-term views ourselves, for fighting in Normandy, but we did not figure on our grandchildren taking over from us!

The sites for air strips had, of course, been previously chosen. The airport construction companies began landing on D-day. On D plus 5, the strip at St. Croix-sur-Mer, was operating: by D plus 8 we had three other fields in our area. Every time a Spitfire or a Typhoon landed on one of these strips, a cloud of dust rose from 100 to 200 feet in the air. While the old Hun was within range, this brought down an immediate barrage of from three to fifteen shells on the air strip. On the morning that our commander of the Royal Canadian Service Corps "Bessionette" was killed, we were watching the barrage from the rear of H.Q. compound. An armoured bulldozer was working on the air strip and while the shells were falling the operator calmly went from one shell crater to another and filled them in, with one or two scoops. For all he knew, one of the boys from the sky might be making an urgent landing any minute, and his job was to keep the strip smooth. Within a very few days, the Dakota transport fleets were using all three strips, along with the Typhoon rocket planes and the Spitfires.

The German airforce made regular visits at night, usually between 10.45 p.m. and 0100 hours, a.m., to our area. The closest view that I personally had of an enemy aircraft was on the morning of D plus 1. The Engineer and I had had a busy night, and we were lying on our backs in a slit trench discussing the situation, when ack-ack fire opened up. Soon, a two-engined bomber, towing a glider skimmed the field astride our trench with wheels almost on the ground. He was using the hedge behind us for cover from our guns on the beach, but did not quite succeed in clearing the next hedge.

On D plus 2, enemy fighter aircraft flew low and casually over our area in groups of six, just outside range of our Bofors. Each night, low flying bombers flew back and forth over the area and dropped enough bombs to cover us with goose pimples. This practice ceased in areas where the Air Support Service units were set up and controlling the fire from our heavy anti-aircraft guns.

At Villeneuve on July 4, I saw seven out of a group of ten German fighters shot down by ack-ack fire in less than an equal number of minutes. On the 7th of July, while we were sitting in conference in a large chateau with windows facing three directions, we saw a plane come down outside each window as a result of what seemed like three shots from ground fire.

The 14th Can. Fld. Amb. and the artillery, received the best directed dose of enemy bombs

for four successive nights, while in position south of Caen. The last time we were seriously annoyed was during one night as we approached the Sienne crossings, when enemy bombers made an all-out attempt to delay our advance by bombing us on the roads around Brionne. It gives one an eerie feeling to be all lit up by flares, when it is much brighter than in daylight, and to know that you are being sought after from the skies. When the green flare target signals came down, if you were under them you hugged the floor of your slit trench and said your prayers, if not, one could casually watch the rather impressive show of seeing some other poor devil get a bit of a pasting.

At Beny-sur-Mer we were surrounded and in range of the enemy from three directions. The position of divisional headquarters from this time onwards was determined by its relation to the brigades which were engaged in offensive operations and it was usually placed centrally between the artillery regiments. At Camilly Barbiére and Villons-les-Bisson we were in the midst of artillery which laid down three of the greatest artillery barrages in history. In preparation for the final capture of Caen, some eight hundred guns fired close to four hundred rounds each in course of three to four hours. We were subjected to sporadic shelling and bombing in every headquarters we occupied, during the first six weeks. In spite of enemy activity I advised the G.O.C. that he should order all troops to sleep above ground, because I had noticed that one's desire to hide was directly related to the time one spent in a trench. When the troops were exposed to mortar fire, they of course had to remain under cover. One artillery commander was unable to leave his slit trench under his half tracked vehicle for three days at one stretch because of mortar fire. The maximum effective range of the enemy heavy mortar was about 4,000 yards. Any battle in which an advance of over 4,000 yards was not made was considered ineffective, therefore, because it did not clean up enemy mortar positions, and it was extremely hazardous to occupy an area in front of prepared mortar positions.

From Barbiére we witnessed the attack by bombers on the approaches to Caen and the defences in the north-eastern part of the town. Four-engined bombers in groups of approximately 165 came in succession, and it was a truly wonderful sight to see these big fellows fly in at about 5,000 feet on a steady, determined, course regardless of the flak which was bursting all about them.

After we had translated some of the German radio conversations, which were quite hysterical on the day of the battle of Caen, we found that they were worried in the morning because they could not get reinforcements up through the town, and in the afternoon those in front of the town were more than upset, because they couldn't get themselves back to safety.

The capture of Carpiquet airdrome, a preliminary operation imperative to the capture of the town of Caen, was undertaken by the 8th Cdn. Inf. Bde., supported by divisional and corps artillery. The 8th Bde. was required to attack across the divisional front from west to east, the final objective being to occupy the town of Carpiquet and all the hangars surrounding the airfield. At this time, the airdrome was occupied, and surrounded, by the enemy on three sides. After the successful occupation by the 8th Bde. they were entertained for over one week by the enemy firing at them from three sides at very close range.

Casualties during the battle were evacuated to the west along what came to be known as the "bad mile"—an exposed piece of road where our jeeps suffered as many as three flat tires and innumerable shrapnel holes during a single trip. The 22nd Can. Fld. Amb. Coy. under command of Major Patten, and the 14th Can. Fld. Amb. under command of Major Norton, evacuated the casualties from the Bde. during, and for one week after, the battle. The 32nd and 33rd C.C.S.'s were within five miles of the Field Ambulance and the 77th General Hospital was only 8 miles away. The casualties during this battle were really messy ones, resulting from close exposure to mortar and H.E. (gun shells). Many of them had large chunks of buttock and thigh muscles completely shot away. On the morning of this battle, we admitted 387 casualties at No. 77 Gen. Hosp. in one and one-half hours.

The outer defences of Caen were cleared up by a well organized attack by the 9th Can. Bde., the 9th British Bde., and the 7th Can. Bde., again supported by a tremendous artillery barrage. The offensive was directed from the west and north. Casualties were cleared through Cairon, mainly by the 14th Can. Fld. Amb. at Cairon and Pierrepont, and the 23rd

Can. Fld. Amb. at Cairon and Beny-sur-Mer. The final destination to General Hospital was again not far distant, being either the 77th Gen. Hosp. at Reviére or the 86th and 88th Gen. Hosp. at La Delivrande. This was the first occasion when we had to relieve one of our Amb. H.Q. during a battle, as the demand for plasma and resuscitation treatment was sufficiently great that the H.Q. resuscitation rooms became over-crowded. This was quite easily overcome by alternating the admission times to four hours admitting and two hours' rest.

The battle to clear the enemy from the south-east side of Caen presented a rather intricate problem, because of the tremendous amount of traffic requiring passage by single lane bridges over the river and canal. It was not a case of return of wounded having first priority, because priority or no there were times when the roads were so jammed with tanks of armoured brigades and armoured divisions that one just could not get through. The Third Can. Div. was not allowed to have heavy ambulance cars across the bridges. We set up ambulance car posts at the near end of the bridges and ran jeeps equipped with stretchers from there to the front lines on the east side of the river. We also made an attempt, with the co-operation of the engineers, to get D.U.K.W.'s across the canal further south after the battle was progressing favourably. Due to the tidal mud banks, we were unable to keep the D.U.K.W.'s operating. The first rush of casualties (approximately 200) was evacuated by the upper bridge to La Delivrande. The remainder were brought out by temporary bridges and given a long cross-country ride to 2 and 3 Can. C.C.S.'s and on to the 7th Can. Hosp. at Bayreux. This was the first occasion when we directed our lines of evacuation to Canadian medical units.

Following this battle, the whole fighting force of the 3rd Can. Div. moved through the bottle-neck formed by the ruined city of Caen and occupied a triangular area to the south of the city. Here we were in a very cramped space on a receding plain with the enemy occupying the high ground overlooking our positions, which were all inside mortar range. This was quite the worst position that any body of troops was ever called upon to hold, and it had to be held as a base for forming up to close the Falaise Gap. The Third Division had by this time been actively engaged for approximately eight weeks. On July 31 we returned through Caen to a rest area near one of our former headquarters. The rest was welcome, but everyone seemed anxious to get back to work at the end of a week. On August 8, we marched back into our old position and continued on the move until we set across the famous Falaise Gap, where many prisoners came our way.

We had cleaned up the 716th Hitler Division and most of the army, naval, and airforce static operational troops in the area. Here, at the receiving end of the funnel at the Falaise Gap, they poured into our sack like herrings out of a net. Boulogne and Calais gave up a total of 25,000. In my opinion they were of two classes. First, the majority, rather simple looking men of many and mixed nationality, whom one might presume were out of a job in their country, before the war, and who had money in plenty and a definite line of occupation for the first time in their lives.

The second group were the real Nazi or Goebbels-trained Germans whom one recognized by their set facial masks and their philosophical convictions. Their attitude in believing only in themselves, Hitler's success on this earth, and our failure, even though our success and strength was made apparent to them, reminded me of an unmarried pregnant girl who was once a patient in hospital. She refused to admit she was pregnant, she refused to admit she was in labour, and when her baby was delivered before her eyes, she loudly refused to admit that it was hers. Here one looked upon beings having a resemblance in form to ourselves, and yet they had brought untold suffering into the world in our time and still intended to continue in their ruthless ways.

A strange ape of man! who loathes thee while he scorns thee;
Half a reproach to us, yet half a jest.
What fancies can be ours ere we have pleasure
In viewing our own form, our pride and passions,
Reflected by a form and mind fantastic as thine!
(Anonymous).

Perhaps one who has lived and mixed with the civilians and armed forces in one great democracy, where one rubbed shoulders and worked with the armed services of another great democracy, would be remiss as a citizen of a third great, but smaller, democracy, if he did

not record or give some intimation of his thoughts and impressions under these circumstances. There are two words in our language, "respect", and "admire". To us as Canadians, these two words in the full sense of their meaning should be a guide in the adoption of any present or future reciprocal attitude or dealing with the peoples of these great nations, the British Nation and the United States of America.

To the British, with whom we lived and endured so much, and whom we found to be possessed of "An infinite capacity to be humble and accept, to be grateful and to give, to be hopeful and labour"—let true democracy forever sing:

Then to side with truth is noble when we
share her wretched crust,
Ere her cause bring fame and profit, and 'tis
prosperous to be just;
Then it is the brave man chooses, while the coward
stands aside,
Doubting in his abject spirit, till his Lord is crucified,
And the multitude make virtue of the faith they had
denied. —Lowell.

To the United States of America, whose stupendous efforts across the extreme width of two oceans staggers us, and whose petty political and social upheavals are too often exaggerated in her current news reports, where under national strain it may be said: "Then none was for a party—then all were for the State". Where better, than in the words of one of own Canadian poets, the late William Wilfred Campbell, can we express what we feel of the part now played by our great neighbour to the south.

She has taught us by this splendid deed
That under all the brutish mask of life
And dulled intention of ignoble ends
Man's soul is not all sordid; that behind
This tragedy of ills and hates that seem,
There lurks a god-like impulse in the world
And men are greater than they idly dream.

About three years ago, the administration of vitamin C was suggested for the treatment of hay fever and other allergic conditions. Generally this therapy has been viewed with scepticism, but nevertheless some have given it fair trial. Most recent of the reports is that of Sidney Friedlaender and S. M. Feinberg, who found that hay fever patients have a normal level of vitamin C. Although large doses of this vitamin produce saturation blood levels, they do not change the course of hay fever or asthma. In view of this and previously published evidence, vitamin C therapy for hay fever and other allergic conditions may be considered useless and wasteful.—*J. Am. M. Ass.*, **128**: 595, 1945.

THE MENTAL HYGIENE OF LATER LIFE

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PHYSICIANS, psychologists and welfare workers are paying increasing attention to the problems of older folk. This is for several reasons.

1. There is an increasing proportion of older individuals in our population. In a recent book George Lawton[1] says that there are now nine million people over sixty-five years of age in the United States, and that by 1980 this will have increased to twenty-six million. There are three main factors in this growth in the proportion of older folk in our population: first, the fact that the achievements of medical science have resulted in an increasing span of life for many individuals; secondly, our altered birthrate; and thirdly, on this continent, a decrease in the proportion of young people entering the country through immigration.

2. Science has been gathering a rapidly increasing amount of knowledge concerning the characteristics and problems of older folk. In a selected bibliography in Lawton's book[2] there are listed 303 titles of books and articles dealing with the problems of the aged. Contributions to this knowledge have come from many sources—from medical men, psychologists, sociologists, and others. Indeed a whole new specialized department of medicine has grown up under the title of geriatrics—the study of the aged. This field of study bids fair to rival the older established study of pædiatrics. Psychologists, too, are increasingly turning their attention to the problem of the aging of human abilities and to the possibilities of learning among the older group.

3. There is also a new social sensitiveness abroad at this time with regard to meeting the needs of the aged in our population. This is reflected in increasing provision for old age pensions, medical care for the aged and homes for the aged.

MENTAL HYGIENE'S INTEREST IN OLDER FOLK

Mental hygienists are increasingly interested in the problems of later life. This is for two reasons. First of all, the aim of mental hy-

giene as expressed by the New York State Health Commission is to ensure that "each individual gives his best to the world and knows the deep satisfaction of a life richly and fully lived". Secondly, mental hygienists are concerned with the problems of older folk because a very large proportion of such problems are due not to physical disabilities but to the thwarting of the older person's psychological needs. It is the belief of mental hygienists that a very large percentage of older folk enjoy a much lesser degree of mental health than they both can and should enjoy.

THE PSYCHOLOGICAL NEEDS OF OLDER FOLK

All human beings have certain basic psychological needs which follow them from the cradle to the grave. These are:

1. *The need for affection.*—To live in reciprocal warm regard with one or more human beings.

2. *The need for belonging.*—To be a desired and desirable member of a group.

3. *The need for independence.*—Reasonably to order one's own life and make one's own decisions.

4. *The need for achievement.*—To do things, to accomplish tasks, to create things and to find success.

5. *The need for recognition.*—To feel that one's personality and conduct meet the reasonable approval of one's peers.

6. *The need for self-esteem.*—To feel that one's personality and conduct come up reasonably to one's own inner standards.

In the past there has been an inclination in many quarters to forget that older people are human beings, too; that these needs are urgent with them as well as with children and younger adults. Indeed it is difficult for any human being to enjoy mental health without some reasonably adequate solution for the fulfilment of the above six needs.

DIFFICULTIES OF OLDER FOLK IN MEETING THEIR NEEDS

1. In the records of our juvenile courts are found many children whose delinquency can be traced to the lack of love in their lives. Likewise every social worker dealing with adults runs into the problem of the individual who is suffering from a starved emotional life. Many of the problems of older folk—the reason why they are "difficult" for example—are caused by the lack of satisfaction for this fundamental need for emotional security. The life partner may have died, brothers and sisters and other contemporaries may have passed on, or the older person may be living in a community where he is isolated from his former friends. Where the older person has children these have grown up and have families and interests of their own. The problem, then, becomes a problem of mattering. Just as young children will go to extravagant lengths and even to downright delinquency in their attempts to solve the problem of mattering to somebody, so older people may be driven to make a nuisance of themselves by exaggerating their physical disabilities and their other handicaps. Their bids for attention may make it very difficult for the people with whom they live. Such behaviour manifestations should be studied as scientifically as in the case of problem children.

2. The need for belonging is tied up with the need for affection. Older people, like children, like to feel that they are a desired and desirable member of some group. They want to feel that they are an integral part of a family group, of a social group and of a community group. The "fringer" who hovers on the outskirts of a group during the adolescent period has a very bad time of it. This is true also for older people if they feel they are not a desired member of a group.

3. The loss of independence is one of the most serious losses for those in later life. Such loss may be due to one or more reasons.

(*a*) Many older folk suffer loss of independence through the over-concern of their children. Through mistaken kindness the sons and daughters may wish the older person to do nothing but rest, and they may deny him the sense of independence which comes from ordering one's own life. Older folk are apt to be kept from doing many of the things which they wish to do and which are undoubtedly foolish from the standpoint of their health. Younger adults are apt to forget that they, themselves, do many foolish things. They stay out later than they should, they eat or drink the wrong things or more than is good for them. They go out when suffering from a cold. However, they object to the old folks doing similar foolish things. Such older persons are often

prisoners of kindness, and are greatly thwarted by such restrictions. Since most adults prefer to do some foolish things even at the risk of shortening their lives, it is a moot point whether older people should not have the same privilege.

(*b*) Many older people lose their independence when living with a married son or daughter because they are considered a general nuisance in the home. Indeed many people seem to take the attitude that old folk have no rights. Living in a home where one is considered a nuisance, or where one is not wanted, would be disastrous to the mental health of almost anyone.

4. The need for success and achievement is vital to the mental health of all human beings. In the case of both children and adults, if they are unable to find achievement in social ways they will seek it through anti-social ways. Indeed nearly all the anti-social conduct we find among criminals and delinquents, as well as in the difficult people we have to live and work with, has as one of its roots a perverted sense of achievement. With the increasing tendency to retire people from their positions in industry and professional life at an early age there arises the serious problem of finding achievement for these individuals. Indeed the trend of modern thinking is that we must retire people not *from* but *to;* that is, we must find adequate means of achievement for older folk. Otherwise they can make a nuisance of themselves through achievement in querulousness, self-pity, etc.

5. From the small child, who wants approval from his parents for his "bag of tricks", to the older child, who wants approval for his athletic, musical or social achievements, and to the professional man, who wants recognition for his success in medicine, law, teaching, public life or science, it is but a short step to the older person who still wants to feel that his personality, conduct and achievements merit the recognition of others. The problem for older folk is to find activities which will give them such recognition. Often the best they can do is, in the case of women, to do mending and sewing, or, in the case of men, to help with the gardening. Nearly all avenues of achievement seem to them to be closed due often to a policy of an arbitrary age limit rather than to the actual decline of ability.

6. No one can have a high degree of mental health without reasonable self-esteem. The commandment "Thou shalt love thy neighbour as thyself" is not without point in its last phrase. No one can love his neighbour adequately if he is so "wobbly" inside that he is chiefly concerned in bolstering up himself. Neurotics do not, therefore, make the best of neighbours. Self-esteem in most individuals comes from achievement in work or play. The older person's self-esteem in our present society is apt to come largely from his past achievements. Unless these have been somewhat outstanding it is rather difficult to live by "clipping the coupons of the past". It is a commonplace that many individuals "go to pieces" soon after they retire. This is because the work which has given them a sense of achievement, recognition and a sense of worth has been taken away from them. Such a deprivation is almost comparable to a deprivation of food.

The problems of older folk are then by no means exclusively physical. They are not by any means exclusively problems of food, clothing, shelter and medical care. This can be seen in the case of the problems of many older folk whose physical needs are well taken care of. Rather it is in the meeting of their psychological needs that older persons are thwarted in our society.

SOME SUGGESTED SOLUTIONS

1. *Assessment of assets and liabilities.*—Psychologists have been doing an increasing amount of work in studying the ageing of mental abilities. Lawton[3] has summarized these. It would seem that those psychological functions which depend on physiological ones are likely to suffer most with advancing age. Vision and hearing are apt to decline in efficiency. Such decline is apt to weaken observation, though the latter is also apt to be affected by emotional receptivity. Both in adulthood and old age individuals see and hear what they want to see and hear. When older people find the world too difficult, or when it is not interested in them, or they in it, they are apt to shut it out by not hearing or seeing it. Reaction time, which involves mental alertness and quickness of response, declines with age. This is very dependent on physiological function and there-

fore shows the most marked loss. Then, too, it is a common observation that old people forget recent experiences. Ability in immediate memory is therefore one of the weaknesses in later life. The ability to learn new things reaches its maximum in the early twenties, and then starts slowly declining. E. L. Thorndike[4] found that there was a 1% loss in learning ability from the age of twenty-five on. However, this loss can be greatly overrated. Those individuals who continue with new learning during their mature years are apt to be able to continue without too much loss until senility, as such, sets in. Many older people cannot learn new things because of the cumulative effect of poor work habits. When it comes to old learning, much of this is quite well retained. This is particularly true of vocabulary.

The one bright spot in the abilities of older folk is that their judgment and reasoning ability is apt to continue at its peak much longer than their other mental abilities. Miles[5] says: "In the test results for performance not necessitating quickness in reaction but depending solely on comprehension, reasoning and judgment; in matters where experience may contribute to the quickness of response; older adults appear most nearly to maintain their characteristic mature scoring level while they continue to maintain mental practice and intellectual interest." In this particular field there is apparently a great waste in utilizing the experience and judgment of older people.

With regard to creative imagination, this is apparently ageless. H. C. Lehman, in a series of papers published in *The Scientific Monthly*, suggests that individuals may think creatively and make valuable contributions at practically every chronological age level beyond early youth. Indeed some scientists have made their chief contributions after the age of eighty. It would seem that the contributions of older folk depend on many other factors than that of mere age. Among these are the motivation to learn good or poor habits of work and study, and the opportunity to make one's contribution.

Doubtless when psychology turns its attention to the abilities of the aged with the same assiduity it has applied to the problems of children very much more will be learned about the possibilities for the use of the abilities of those who have reached later life.

2. *Adult education for older folk.*—In the last few decades there has been a great growth in adult education. This is due to a realization that the problems of life do not cease with adulthood and adolescence but continue throughout the life-time of the individual. Because all adults are faced with such problems as, how shall we care for our bodies; how shall we rear our children; how shall we work together; how shall we play; for what things shall we live; there is need for education throughout the whole adult period. Because older folk have their problems of living in a family, in a community and in a nation there must be education for them too. Schools must be provided for the aged which will meet their needs. They need, in addition to schools, recreation centres, arts and crafts centres, shelter workshops, and possibly marriage brokers. At present we have only glimpses of the possibilities of such a program.

3. *Vocational guidance for older folk.*—A great deal is heard today about vocational guidance for youth. There is need for vocational guidance for adults as well. Instead of retirement from a life-long occupation when a certain age is reached there should be in industry provision for the gradual shifting of individuals in accordance with the needs and abilities of later life. Since physical abilities decline relatively early and certain other abilities, like judgment and reasoning, decline relatively late, it should be possible to find places in our society where the experiences and judgment of older people could continue to be of value.

4. *Old age counselling centres.*—Child guidance clinics are well established. Counselling centres for old age are bound to have an increasing place in our life. One of the pioneers in this movement was Dr. Lillien J. Martin who, on being retired from a chair of Psychology, at Stanford, established a centre in San Francisco for the counselling of old people. She, herself, learned to drive a car at seventy-seven and continued with her work of counselling up to her death at the age of ninety-two. The department in welfare work for the counselling of older people will receive increasing attention.

5. *Heading off maladjustments.*—Those who work with maladjusted adults are very well aware that the difficuties of these persons have

their roots in their childhood. An increasing emphasis in the field of mental hygiene, has, therefore, been put on prevention. This idea of a sound positive program of mental hygiene for childhood and youth is particularly important for success in a program of helping people in later life to grow old gracefully. Shaffer[6] defines an individual's personality as his "persistent tendencies to make certain kinds and qualities of adjustment". He conceives of defense mechanisms, withdrawing mechanisms and adjustment by ailments as the tools which individuals have developed in their attempts to meet their needs, and solve their problems. Obviously after an individual has used for sixty years such tools as bossiness, bullying, boasting, self-pity, oversensitiveness or ailments, he is likely to continue to use these methods when he runs into the difficulties and problems of later life. Long ago it was said that the mental hygiene of adolescence lies in early childhood. It might equally be said that the mental hygiene of old age lies to a considerable extent in the childhood and youth of the individual concerned.

6. *New social awareness of the problems of the aged.*—Further scientific studies need to be made as to the best methods of solving the problems of older folk. Whatever sound knowledge is obtained may need to be applied to break down some of the traditions of our society with respect to the care of the aged. It has been the custom in our society for aged parents to be taken into the homes of their married sons and daughters. In practice this has worked out poorly in a large percentage of the cases. Either the old folk have been unhappy, or the young folk have been unhappy, or both. There has been a tendency in our society to regard old folks going into homes for the aged as a family disgrace. This attitude may need to be altered as better ways of living for old folks are discovered. Apartments for old folks with food, laundry and recreational services, and where they might find life with others of their own age, may need to be developed. With increasing urbanization it is increasingly difficult to fit older folk into small homes with limited space where they must live with two younger generations.

The solution of the problems of older folk, like other mental hygiene problems, is a team job. It depends on the co-operative endeavour of medical men, psychologists, welfare workers, educators, nurses, sociologists, clergymen, and others.

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RÉSUMÉ

Le nombre des individus âgés de plus de 65 ans va sans cesse augmentant et l'hygiène mentale de ces aînés pose un problème urgent. On doit s'occuper davantage de résoudre les difficultés des vieux. Il est manifeste que les vieux souffrent de multiples frustrations, aussi bien physiquement que psychiquement. Les personnes âgées ont besoin d'affection, d'attentions et de sympathie comme les jeunes. On doit maintenir chez eux le sens de l'ambition, de l'émulation et des responsabilités. On peut éviter beaucoup de désastres moraux chez les vieux en utilisant davantage les données de leur expérience et de leur jugement, en créant pour eux un programme d'éducation, en établissant pour eux des centres d'orientation, et surtout, en améliorant l'étape difficile de la retraite. Le grand public doit être mis au courant des difficultés des psychologues et des médecins afin de participer activement à la prophylaxie des désordres physiques et psychiques des délaissés de la vieillesse.

JEAN SAUCIER

SOME MENTAL HYGIENE PRINCIPLES*

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ARE there simple rules for keeping in good mental health analogous to the usual rules for keeping in good physical health? Can a physician speak as authoritatively about mental health as he can about physical health? Is the average physician as capable of assessing minor deficiencies in mental health as he is of recognizing slight variations from the normal in the physical field? And if he does recognize slight deviations from normal mental health, is he able to modify the advice he is asked for to suit the needs of the individual patient who seeks to maintain himself in the best possible physical and mental health?

It might be suggested that health is indivisible and that the general practitioner should be competent to offer authoritative advice on

* This address, in slightly different form, was delivered at the Annual Meeting of the Manitoba Medical Association, Winnipeg, September 14, 1944.

health matters in their physical and mental aspects. The conscientious physician is likely to have difficulty, however, in being sure of his advice on mental health because of the under-emphasis on mental medicine in his university training and because of his difficulty in finding medical literature dealing with mental health in its positive aspects. His difficulty is increased rather than diminished by the great number of books written for the general public on the general theme of the healthy personality but he has no way of appraising the relative value of these books, some of which are excellent and dependable while others may actually be dangerous.*

Having observed for more than a quarter of a century that many people suffer minor or major degrees of mental ill health, I am of the opinion that there are certain general rules for maintaining good mental health. Before presenting these principles, I would define the mentally healthy person as one who derives or attempts to derive satisfaction from the living of his life, (not at other people's expense, and not by unhealthy escapist methods), who is efficient at his work, who gets along well with his fellows, and who, in times of special stress, still maintains reasonable efficiency and stability.

This definition is in several parts and involves emotional values honestly come by (not by narcotics, day-dreams, suicide or crime), success in one's work, good social integration and a reserve of mental strength to carry us over the heavy hazards, which confront all of us at various times in our lives.

If we look at ourselves in the light of this definition we may see that, even as we have minor degrees of physical ill health, so we have minor degrees of mental ill health. For example, we do not always get satisfaction from our job (the law of diminishing returns), or we get satisfaction in questionable ways, by periodic sprees, by bullying or dominating others; we are not always efficient at our work, having our lazy periods or times of let-down and loss of energy or even abnormal excesses of energy; we do not always get along well with our fellows, we may be suspicious and unfriendly; we may be seclusive or gloomy, and most of us can remember that our mental strength reserve may not have been all we would desire when some severe crisis overtook us, but we accept these minor degrees of mental ill health as to be expected even as colds, hay fever, fatigue and chilblains may be a part of our physical situation. Who wants to be perfect anyway? Nevertheless, ignorance of the rules or persistence in unhealthy mental habits may have more serious consequences which as a part of health education we want to avoid in ourselves, our children and our patients.

Let us then review briefly some mental hygiene principles:

1. The right of the individual to be well-born. We are agreed probably that the frankly defective, epileptic and mentally ill should not reproduce but there are many borderline cases, who for their own sakes and the sake of possible progeny should not have children. We can at least instruct these people on the advisability or inadvisability of having children and may be able to assist them in making proper decisions. We still have a long way to go, however, to reach a proper system of eugenics in the human species. It should be borne in mind, nevertheless, that mental diseases are not inherited as such. Only predispositions are inherited, so that children born of tainted stock may, with proper guidance and training, live mentally healthy lives. It is a part of the mental hygiene gospel that no psychoses are inevitable but rather that all are preventable if the training and environment can be adequately regulated.

Aside from these eugenic aspects, being well-born also depends on the very practical implications of good pre-natal care, good obstetrical care and the successful feeding and rearing of the child, especially during its first few years of life.

2. The second principle has to do with the physical welfare of the individual in all stages of his development. A sound mental hygiene principle is to keep the person well physically. The robust child, protected against infection by inoculation and environment, practicing good physical hygiene throughout its life, avoiding physical excesses, having the benefit of an annual health examination, all these increase the defensive forces of the individual and make

* It is not the purpose of this address to advertise one or more of these books but the writer would suggest that physicians desiring a good reading list in mental hygiene may obtain dependable information from the National Committee for Mental Hygiene (Canada), 111 St. George Street, Toronto.

it easier for him to live life healthfully. True, some remarkable exceptions are known where physically handicapped people have developed remarkable mental health: Roosevelt, with polio; Helen Keller, blind and deaf; crippled Steinmetz; but these are exceptions. Debilitating and distressing physical handicaps too often prevent people from enjoying mental health at its best.

3. The importance of a satisfying home life for the developing child. A great deal of time could be spent on this feature. Even though we may have marked individual differences and may not all need the same environment, nevertheless there are many points applicable to all. That the home should have decent economic standing is taken for granted, that it should be sanitary and pleasant is also important. Still more important is the environment provided by the parents themselves—do they want this child? Are they harmonious in their own interpersonal relationships? Do they train the child fairly and not oversolicitously nor yet lack affection for it? Do they realize they are training this child for ultimate emancipation and maturity? Do they make the child the victim of their own emotional dissatisfactions or cravings? Do they seek to develop the child in a well-rounded manner? Do they build up self-confidence or an inferiority complex in the child? One can touch only lightly on these points and for further discussion I would refer you to the works of mental hygienists, especially our Canadian contributors—Blatz,[1] Myers,[2] Griffin, Laycock and Line.[3]

4. The fourth principle concerns the habits the child learns. Here we have parent-child, teacher-child, and inter-child relationships and how the child can use them for building habits which will strengthen his personality. Does he learn self-control? Does he learn how to play and work with others? How does he learn to react to disappointments? Does he cultivate good ethical standards? Does he seek to stand on his own feet? Does he receive and profit by good sex instruction and by sound religious training? If you ask what do I mean by good sex instruction I would say, answer all his questions frankly and honestly and only so far as he seeks information; prepare the child for the physical changes that will accompany adolescence and explain their purpose; and treat any autoerotic interests and manifestations on an unemotional basis, as one would deal with any other tendency which interferes with his social development. Above all, do not burden the child struggling to overcome these tendencies with ideas of sin and guilt or with threats or statements of the dire effects of masturbation. Occasional masturbation is not in itself harmful, but the ideas of sin, guilt, self-reproach and shame which parents, teachers and the clergy have too often wrongly emphasized, these may seriously handicap the child and should be carefully avoided.

5. The fifth principle has to do with the development of good foundations for the mental superstructure he will later erect. I regard these foundations as four different aspects of security to be achieved by training, education and environment. These are, first, security in himself, self-confidence, an appreciation of his own assets as well as his handicaps and the assurance that he can take his place on at least an equal footing with his associates; secondly, security in his affectionate relationships, to know he is loved and valued by his parents or later his sweetheart and his wife and that his sex relationships are mutually satisfying; thirdly, security with his fellows, his acceptance by them in friendly co-operation and also a sound economic relationship with those with whom he works; and fourthly, security in the cosmos, a friendly acceptance of the universe and its laws and a realization that when properly understood and adjusted to, these divine laws are beneficial to him. This means a satisfying religion and philosophy of life.

6. The sixth mental hygiene principle has to do with the understanding and avoiding of certain unhealthy mental mechanisms. There are several of these but I shall refer to only two—projection and rationalization. These are dependent on a desire to be always right in order to avoid feelings of guilt or discomfort. In projection the individual refuses to accept any responsibility when things go wrong and projects the blame or responsibility on to his assistant or subordinate or his wife—"passing the buck". A common example is the quizzical look a golfer gives his club when he makes a bad slice. It is bad to make the slice but one still preserves the feeling that he is all right; the trouble is with the club.

Rationalization means the inventing of reasonable sounding excuses for doing the things we like to do or want to do; that is, an attempt to deceive ourselves, to make ourselves believe in a state of things which actually does not exist. An example might be the so-called reasons why we take alcohol to excess, why we stay away from church, why we don't pick up hitchhikers unless they are soldiers or good looking girls; we say we are too busy to do a task we dislike to do. Projection and rationalization are therefore irrational (*i.e.*, emotional), they are part way on the road to delusional thinking or psychotic behaviour and are therefore to be avoided. If we don't want to avoid them we should at least know that we are fooling ourselves more than we are deceiving or impressing those about us.

7. The seventh mental hygiene principle is the understanding and practising of a very important and desirable mental mechanism—sublimation. Sublimation might be defined as the refining of our crude, primitive, unethical desires and aggressive drives into ethical, socially valuable goals and achievements. This is the mark of the truly civilized, mentally healthy individual. Our primitive instinct to attack and destroy anything that stands in the way of our ambition can be sublimated into attacking those things that interfere with social progress—crime, vice, ignorance, disease. We are so thinly civilized, that in wartime we readily give active expression to our primitive killing instinctive tendencies, witness the terrible world wars all of us have seen. William James' search for a "moral equivalent for war" should still be our search and it should not be far to seek. Hitler, completely unsublimated, plunges the world into untold misery seeking the unattainable and unethical goal of national and personal world supremacy. We need to be always sublimating adequately in our personal and national ambitions if we are not to revert to cave man standards.

8. The eighth principle I would emphasize is the development of constructive escapes. We speak of escapist literature, meaning books and stories having little value in themselves but giving us the value of getting away from ourselves and our responsibilities as we may need to. I spoke earlier of the undesirability of gaining happiness through psychopathic or destructive escapes—alcohol, drugs, crime, suicide and psychosis—but all of us need rest periods, escape periods, as everything does. But there are constructive escapes, too; those which add something to our personalities while they also give us temporary surcease from our cares. Some of these might be sleep, books, the theatre, vacations, the radio, art, sport, games, hobbies, medical conventions or service club meeting. We should always have these in mind for our own mental health as well as for some of our patients whose escapes have been the opposite type, such as alcoholic addiction. The replacement of a poor escape by a good escape should be an essential part of treatment.

9. The ninth principle has to do with the regulation of our emotions. Our emotional reactions, that is, the way we feel, determine to a large extent the way we think and what we believe and how we act and even influence the state of our physical health. Professor Cannon of Harvard, in his remarkable books, *Bodily Changes in Pain, Hunger, Fear and Rage,* and *The Wisdom of the Body,* showed how these and similar emotions, by stimulating the adrenals and the sympathetic nervous system produced rapid hearts, decreased digestive juices, retarded digestion and peristalsis, interfered with sleep and caused many other physical alterations. Such a mechanism is a valuable asset to us or the lower animals when these emotions are needed to fight or run from the enemy but it is a handicap to us at other times if we needlessly indulge in these emotions and others like them, shame, jealousy, hate, remorse. The present very great developments in psychosomatic medicine are based largely on the stimulus given by the pioneer work of Cannon. Our present acceptance of the emotional factors in peptic ulcer, neurocirculatory asthenia, asthma and hay fever, arthritis and hypertension should impress all of us with the necessity of searching for emotional etiology in disease as well as toxic or bacterial factors. Disturbed emotions can cause reactions of projection and rationalization already referred to, but can actually produce delusional ideas and hallucinations. Concern over sexual impotence for example may lead the individual gradually to a belief in his wife's infidelity; feelings of inferiority and envy may produce delusions of persecution; loneliness and craving for love and power may lead to delusions of grandeur and messages from God. Deep depression, from whatever cause, may make us believe in

the hopelessness of our efforts, that God has forsaken us, that there is no health in us. While it may not always be possible, or even desirable, that we should have only pleasant Pollyanna emotions, we should at least know the risks we run and our patients run if they habitually indulge in unharmonious emotions.

How to modify them? Perhaps not easy. Children imitate their parents' emotional reactions, so that might be a starting point, to impress on parents the need of emotional tranquillity if they want their children to be emotionally stable. The child should be taught that life will always have its difficulties but there are mature and immature ways of reacting to them. Children can be emotionally inoculated by learning how to react to the minor difficulties of childhood so they will not collapse emotionally when faced with the more serious stresses of adulthood.

We speak also of controlling emotions. I doubt if we can really control them except by good habit training on the one hand and by controlling the physical expression of emotions. The individual who leads with his chin every time he is offended gets angrier (and incidentally more battered) than if he had kept his muscles relaxed instead of tense and aggressive. We feel more courageous if we literally keep our chins up. Conversely we feel more depressed and hopeless if we allow ourselves to physically collapse.

10. The tenth and last principle I should like to emphasize is the importance of environment. Each type of plant, of bird and animal, including the human animal, has its own environmental preference in which it can best thrive. In some other type of environment it cannot do well and may die. For our physical health public health has done much to remove unfavourable environmental influences, such as the malaria organism and anopheles, yellow fever, plague, syphilis; we have removed children from the stultifying influence of sweatshops and mines. We have improved housing. We have not done so well in the field of mental health. In our lifetime we have gone through two world wars and a terrific economic depression. There has been little personal or national security. We have poverty, vice, crime and disease about us.

Too many and too severe stresses overwhelm many of us. While difficulties are needed to develop mental strength and vigour these environmental difficulties should not be excessive. In the provision of a healthy international and economic environment our statesmen and business executives have a great responsibility for intelligent leadership so that all of us, even the frailest of us, may have a fair chance to develop our personalities, to gain satisfactions and to contribute to the world's work and to the progress of civilization so far as our capacity and training permit.

It is not suggested that these ten mental health principles are all that could be enumerated or that they are presented in anything but the briefest outline. Nevertheless a review of them will indicate that good mental health depends on attention to a variety of influences; eugenics; obstetrics, gynæcology and pædiatrics; physical health; the home, the school and the church; good habit formation; certain psychological mechanisms; economics and social integration and a healthful environment broadly conceived.

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A STUDY OF PERSONALITY FACTORS AMONG VENEREAL DISEASE PATIENTS

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THIS paper considers some of the factors contributing to the acquisition of venereal infection among Canadian Army personnel.

MATERIAL

A recent survey was made in one military district in Canada of 292 consecutive cases of V.D. occurring among male soldiers. Records of psychiatric reports were used for information about the personality of the men. Wherever necessary, social service reports were obtained. Information regarding the military efficiency of

the patients was secured from training records and Army Examiner's reports.

A control group was secured by making comparative personality studies of 158 soldiers selected at random from a group of 1,000 consecutive files in the Depot personnel selection office. The age distribution, the marital status, and education of the control group were found to be within 2% of the figures taken from the 1,000 files.

Results of Analysis

Age and Marital Status as Factors

Percentage Age Distribution of Patients Studied

Age group	*V.D. patients*	*Control group*
	%	%
Under 22	28	43
Between 22 and 30	43	37
Between 31 and 40	18	18
Over 40	3	2
Not stated	8	0
Total	100%	100%

Percentage Marital Status of Patients Studied

Status	*V.D. patients*	*Control group*
	%	%
Single	28	31
Married	59	67
Not stated	13	2
Total	100%	100%

The percentage of men under 22 in the control group is 15% higher than in the V.D. group, which would suggest that V.D. is less likely to occur in the recruit under 22 than in the 22 to 30 age group. The percentage of married and single men in both groups was approximately the same.

Psychiatric Abnormality in Venereal Disease Spread

Certain Psychiatric Factors Among V.D. Patients Showing Percentage of Total Group with These Factors

Psychiatric factor	*V.D. patients*	*Control group*
	%	%
Abnormal childhood environment	36	18
Marital incompatibility	32	10
Excessive alcoholic habits	19	less than 1
Psychiatric referrals	43	5

The term "abnormal childhood environment" is intended to include cases where at least one of the parents was dead or was markedly unstable emotionally, or where there was separation or divorce. The percentage of soldiers in the V.D. group with abnormal childhood environment was twice as high as in the control group.

The percentage of marital incompatability (divorce, separation or frequent quarrelling) was three times as high as in the control group.

A record of drunkenness obtained from conduct sheets and from V.D. records, occurred 19 times more frequently among the V.D. patients than among the control group.

Records of psychiatric consultation among V.D. patients were examined. A sharp contrast is noted in the percentage of psychiatric referrals in the V.D. group as compared with the control group. It is important to note that none of the V.D. cases was referred to the psychiatrist because of V.D. All had been referred, independently, because of unsatisfactory adjustment or lack of progress in training. Yet 43% of the V.D. group had been referred to the psychiatrist as compared with 5% of the control group. Ninety-five per cent of the men in the V.D. group who had been psychiatrically examined were found to have emotional or intelligence handicaps existing in a chronic state. This handicap was sufficient to lower their categories and seriously impair their usefulness to the Army. Approximately one-half of those referred for psychiatric examination were discharged from the Army with a diagnosis of psychopathic personality — an unstable individual who has excesses in many aspects of his life.

To check this further, in the military district which was the locale for this study, all cases discharged from the Army with a diagnosis of psychopathic personality over a six-month period were studied and compared with 100 consecutive neurotic patients who also had been discharged. Among those discharged with a diagnosis of psychopathic personality, 25% had a proved history of V.D., while in the neurotic group only 3% had had V.D.

It was observed further that approximately 20% of all men who received psychiatric examination were found to be mentally retarded. By this is meant a mental dullness (as opposed to a mental defect) which is sufficient to limit a man's capacity to absorb training at the normal rate. Only 5% of referrals were found to be emotionally stable and to have average intelligence. It was noted that during psychiatric routine questioning of a soldier about V.D., the soldier frequently denied having been infected, although records concerning his infection were present in the office of the V.D. Control Officer.

FACTORS IN MILITARY ENVIRONMENT CONCERNED IN V.D. SPREAD

CERTAIN MILITARY FACTORS AMONG V.D. PATIENTS SHOWING PERCENTAGE OF TOTAL GROUP WITH THESE FACTORS

Military factors	*V.D. patients*	*Control group*
	%	%
Efficiency poor	40	19
Detention	17	5
Military conduct poor	28	7
Dissatisfied with army routine	24	8
Grade VII education	54	71

The percentage of men with poor military efficiency was twice as high in the V.D. group as in the control group. The amount of poor conduct, as measured by the number and frequency of entries on the conduct sheet, and periods of detention were four times as high.

Compared with the control group, there were three times as many men in the V.D. group who stated they did not like their allocation.

Grade VII education was taken as a yardstick. Seventeen per cent less men had passed Grade VII in the V.D. group than in the control group. This is also reflected by the results of the M test in the two groups—the control group scoring 10% better marks than the V.D. group.

Multiple infections comprised about 12% of the total number of infections. Of all the cases that had at least two separate infections, 80% were discharged independently of V.D. with a diagnosis of psychopathic personality, unfit for any service.

To summarize, the main predisposing personality traits among the V.D. patients were found to be related to the following:

1. Unstable men who do not control themselves in any aspect of their lives (psychopathic personalities).

2. Habits of heavy drinking which are related to instability.

3. Promiscuous men who are immature in their attitude and behaviour.

4. Men who are too dull to be good soldiers and to avoid V.D.

The common precipitating factors were found to be the following:

1. Assigned to work that the man does not like.

2. Punished for a crime similar to that committed by others fortunate enough to escape punishment.

3. Quarrel with his wife or girl friend. Some of the cases of V.D. were acquired under severe provocation. One man received anonymous letters stating that "his wife was running around. She was spending all of their money, and the children were being neglected." This man became intoxicated. He met a sympathetic girl, was exposed, and developed V.D.

THE EVALUATION OF THE V.D. PATIENT

We have considered here a large body of physically fit men recruited from civilian life and placed in a military environment entirely new to them. Physical and environmental factors related to both civilian and military life have their part to play in the acquisition of V.D. It is important to determine, if possible, if the V.D. is the result of an episode due to some temporary emotional upset or the result of a pattern of irresponsible behaviour.

It is not fair to conclude that because a man contracts V.D. he is necessarily a poor soldier. Every case must be considered individually. Anybody can make a mistake. A good soldier may get V.D. However, if a man gets V.D. twice, or more often, it indicates a weak personality because he does not learn by experience. Such patients should be thoroughly investigated.

The spectacular success of penicillin in the treatment of gonorrhœa and early syphilis has led some medical men to conclude that the V.D. problem has been practically solved by the use of this powerful therapeutic weapon. However, curing an urethral discharge or penile sore does not influence immature habits of behaviour which contribute to the acquisition of venereal disease. The personality will still have to be treated on a social basis to prevent, for instance, the unhappy marital adjustment associated with promiscuity.

Some men annoy their medical officer with the belief that they have a venereal disease. Careful history and examination may disclose no evidence of disease. Often the history indicates that they were not even exposed to infection. This false belief, which is very hard to overcome, is a symptom of a much more serious disease than urethritis. Behind this belief may be a strong feeling of guilt. It is usually unwise to try to shake such an individual from this belief. The best course of action is to refer such a man to a psychiatrist.

SUMMARY

A personality study was carried out on 292 male cases of V.D. occurring in soldiers from one military district in Canada. A control series of 158 men was similarly studied. From the results obtained, it was found that a significantly large proportion of soldiers who developed V.D. have personality defects. In the evaluation of the V.D. patient, consideration should be given to the factors in the military and civilian environment of the patient that have been partly responsible for the acquisition of his infection.

CHRONIC RIGHT-SIDED PAIN IN WOMEN*

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THERE was an epoch in medical history when the operating surgeon was a most necessary agent in opening the Pandora box of living pathology, and for fifty years he pushed back the frontiers of our ignorance in an amazing fashion. As a result we yielded him the glamour of a conquistador—and the golden rewards. I wonder if we should continue much longer to do so, for with surgery as with geography the last frontiers have been opened up, the last body cavities explored, and further surgical advances will probably be mainly along the lines of improved technique. Even technique has been so standardized that any fresh medical graduate possessed of a modicum of courage, a nearby hospital and a textbook on operative surgery, can set himself up as a surgical glamour-boy. As a result a great deal of unwise and unnecessary operating is being done, too much of it in the bellies of unfortunate women suffering from chronic low abdominal pain, and in particular chronic right-iliac pain. I use the term "unfortunate", because so large a percentage of women so operated upon receive no benefit from the surgical procedure, and a fair number of them are actually made worse.

Let me outline briefly what often happens to the unhappy woman with this symptom. First, her appendix is removed. Then, being still in possession of her pain, she becomes a candidate for the gynæcologist—if it wasn't her appendix it must be her ovary or her retroverted uterus. So she undergoes a partial or complete resection of her ovary, or a suspension of her uterus. But she still has her pain. The diagnosis is now "adhesions", and she undergoes another laparotomy, or perhaps a subtotal hysterectomy, or some plastic work on a slight cystocele. By this time even the most abandoned operator has begun to doubt the efficacy of the Bard-Parker, and sends the poor woman to an internist. Perhaps the internist treats her for constipation or an irritated cæcum, or perhaps, recognizing the neurotic element in what the patient herself is beginning to describe as increasing "nervousness", he throws in his hand scientifically and prescribes the artful bromide or barbiturate. But the woman still has her pain.

If the story just unfolded sounds exaggerated or fictional to you, it is very real to me, since I am constantly seeing women who have run some such surgical gamut. As a gynæcologist attached to a general hospital I am called into consultation more often for chronic right-sided pain than for any other single condition: a great many of these women have had surgical operations without relief. In my private practice in 1944 I saw 42 women with this symptom, of whom 12 had had one operation, 5 two operations and 3 three operations without relief. Only the other day I saw one who had had five operations without relief!

Because the symptom has been so common in my practice and because there seems to be so much ignorance concerning its causes, I have tried to learn something about it. I am sorry to have to admit that I have learned very little; like Aristotle, all that I know about it is that I know nothing. Perhaps that is a very poor reason for coming all this distance to discuss it, nevertheless I felt that it might be useful to share my perplexity with you.

I shall approach the subject from the standpoint of the various diagnoses involved. (1) Chronic appendicitis. (2) "Adhesions". (3) Painful right ovary and/or Fallopian tube. (4) "Cysts of the ovary". (5) Painful right

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ureter. (6) Retroversion, tears or erosions of the cervix, prolapse. (7) Painful cæcum, with or without constipation. (8) Root neuritis of the posterior branches of the lower dorsal or first lumbar spinal nerves. (9) As manifestation of a neurosis.

Chronic appendicitis.—Despite the fact that many surgeons claim there is no such diagnosis, it seems to be the one most commonly arrived at. Even some of our best surgeons appear to do appendectomies in this type of case. They would certainly not continue to do so unless they thought they were obtaining cures. Perhaps they do get cures in some cases. But how many surgeons have followed up such operations for a year or more? I can tell you what happens to some of these cases; either (1) there is no relief whatsoever from the operation; or (2) there is relief while the patient is resting, but the pain recurs when she takes up her work again; or (3) the pain is relieved, but a similar pain appears on the left side within a matter of a few weeks or months of the operation.

Some surgeons might claim that this last group constitutes a cure insofar as the diagnosis of chronic appendicitis was concerned and that the operation was therefore justified. But I cannot believe that such a claim is valid. Let me illustrate by a case I saw only the other day. This woman had her appendix removed two years ago with relief of her right-sided pain. Two months later she developed a similar pain in the left side, for which a "cyst" was removed from the left ovary and a ventrosuspension done. She still has left-sided pain, but in addition has developed deep dyspareunia. This recurrence of pain elsewhere is not uncommon and when it happens within a few months of an operation I believe that we should regard the success of such an operation with the greatest skepticism. Furthermore, in these appendices removed under a diagnosis of chronic appendicitis, the pathologist is seldom able to demonstrate any satisfactory evidence of an inflammatory process; they show no change from those appendices that we often remove routinely in the course of some other low abdominal operation.

Under what circumstances are we justified in making a diagnosis of appendicitis? I think most surgeons would agree to the following: The pain is colicky in nature, lasts for a few days and clears up for weeks and months. It usually begins around the umbilicus. It is associated with nausea, vomiting or some change in the action of the bowels. The point of maximum tenderness is over McBurney's point and is increased when the right rectus is put on the stretch. There is a mild leucocytosis, with perhaps a slight rise in temperature.

Unless this picture is present, no diagnosis of appendicitis should be made and the case should be further investigated before any operation is done.

Adhesions.—A great many patients who have had an appendectomy or other low abdominal operation without cure of their pain are told that they now have adhesions, and that this is the cause of their continued suffering. Is there any well-substantiated evidence that adhesions cause pain? The following would seem to deny it: (1) Very few abdominal operations are done without some adhesions resulting. These adhesions may be very extensive and yet cause no pain. (2) When abdomens are reopened on a diagnosis of adhesions, only minimal adhesions may be found—or none at all. (3) Separation of these adhesions does not relieve the pain permanently.

The only thing that can be said in favour of this diagnosis is that it more or less satisfies the patient as to why she still has her pain. But why should we explain thus the continuance of a symptom that was present before the operation that could have caused the adhesions was done? I believe it would be a good thing if we ceased supporting our surgical infallibility on so feeble an alibi.

Painful right ovary and/or Fallopian tube.—The history of pelvic surgery is strewn with innocent, ablated ovaries, ovaries removed for chronic right or left-sided pain. This is the sort of clinical picture for which it is done. The woman complains of a more or less constant iliac pain, which is worse just before and during menstruation. When she is examined bimanually the ovary appears tender, and any abdominal tenderness present will be definitely below McBurney's point. Often the pain radiates down the front of the thigh and there may be a definite nodal point in that region. Such a picture certainly points to the ovary as being the cause of the pain, but when it is removed in whole or part, or the ovarian leash of vessels with the contained nerves resected,

or a presacral sympathectomy done, the pain may not be relieved. Occasionally with such a clinical picture, varicose veins of the broad ligament will be found, and their removal does relieve the pain.

Practically always when the abdomen is opened in these cases the ovary appears grossly normal, nor does microscopic section reveal any abnormality. It is my impression that the ovary itself rarely causes pain, except under the three following conditions: (1) Where the organ is prolapsed under a retroverted uterus, in which case dyspareunia is the painful symptom complained of. (2) Where an ovary, left behind after removal of an inflamed tube, becomes deeply embedded in adhesions, or becomes cystic. (3) When the ovary is involved in endometriosis, in which case the predominating symptom is dysmenorrhœa.

I would say that, before removing an ovary for iliac pain, one should have been able to palpate the organ between the fingers on bimanual examination, and that while this was being done the patient should have stated that there exactly was the location of the pain. But even when such was the case I have removed the ovary without relief of the pain.

A diseased Fallopian tube is a much more common cause of iliac pain. When the tube is grossly swollen there is little difficulty in making the diagnosis, but when the swelling is so slight as to be impalpable, the diagnosis is not often made until the abdomen is opened unless there is a definite history of a previous acute attack. When only the right tube is involved, or when, even though both are, the pain is felt only on the right, the condition comes within the diagnostic gambit we are considering. In such a case, removal of the tube and not the ovary cures the pain.

Cysts of the ovary.—I don't know how many women have told me that they have been operated upon for "cysts of the ovary", usually as a supplementary to appendectomy, but sometimes as a second operation when appendectomy has failed to relieve the pain. The number must run into hundreds. I recall once hearing a paper in which the surgeon declared that he had removed 170 such cysts.

What are these cysts that so commonly meet the surgeon's meddlesome knife? I believe that for the most part they are nothing more than ripe Graafian follicles. Few surgeons seem to realize that the ripe follicle can be as large as the rest of the ovary, and still be normal. I do not believe that they are ever a cause of pain. They are practically always present in the bleeding condition known as metropathia hæmorrhagica, but ovarian pain is never a symptom of that condition. Their removal constitutes nothing less than a surgical crime. What happens appears to be something like this: the surgeon has operated for chronic appendicitis and found a too normal-looking appendix: because the patient is a woman he therefore reaches down after the ovary and finds this ripe follicle that suddenly expands in his ignorant eyes to pathological dimensions —so he hoicks it out. I believe that these "cysts of the ovary" belong in the same category with "adhesions" as an utterly unsubstantiated diagnosis.

Painful right ureter.—Here I speak with some diffidence, since I am somewhat out of my field, but the following conditions can cause chronic right iliac pain: (1) Chronic pyelitis; (2) stone in the ureter; (3) stenosis of the urethra or ureter.

Apart from chronic pyelitis none of these conditions is common, and pyelitis should be readily diagnosable as a result of the routine urinalysis. The point I wish to make is that all cases of inexplicable chronic right-sided pain should have the benefit of a cystoscopic examination, and when this is done regularly every now and then a suddenly bright light will shine in a dark place.

Torn and eroded cervix; prolapse; retroversion.—A torn and eroded cervix should be cleared up either by cauterization or repair, and prolapse should be cured by repair on their own merits alone. Both conditions occasionally cause chronic iliac pain, but when the pain persists after operation it is due to some other cause, and that cause should be sought for.

But one should be very sceptical about retroversion as a cause of chronic iliac pain, especially chronic right-sided pain, and even more especially when such pain is the only symptom complained of. There was a time when retroversion was looked upon as a pathological position of the uterus and suspensions were done for everything from backache to globus hystericus. That that day has not entirely passed is evidenced by the number of suspensions still being done. In 1944 I saw 34 women

who had been told in explanation of certain symptoms that they had a "tipped" womb. In 22 of those cases the womb was anteverted when I examined them, and in the other 12 I could not satisfy myself that the retroverted uterus was the cause of the symptoms complained of. In 1944 I did 3 private ventrosuspensions: one for sterility—and the woman is not yet pregnant: one for dyspareunia, which cured the patient: and one for a combination of backache, bilateral iliac pain and weight in the pelvis—this patient still being in possession of her symptoms. I believe that the day has come when we should teach and practice that retroversion is a normal position of the uterus, just as a retrocæcal position of the appendix is normal for that organ. Only by so doing can we rid ourselves of this silly diagnosis of a "tipped" womb, and the equally frivolous surgery we perform on it.

Painful cæcum with or without constipation.—Our first impulse when we obtain tenderness on pressure over McBurney's point is to think of the appendix: it is almost a conditioned reflex. But the cæcum also lies under McBurney's point and why shouldn't it get tender sometimes? I believe that a fair number of the cases of chronic right iliac pain and tenderness are due to an irritable cæcum. I believe that there are two factors which can produce an irritation of the cæcum sufficient to cause such pain and tenderness: (1) constipation, which by holding up fæcal matter in the cæcum produces a sort of localized colitis or distension; and (2) irritating food elements and irritating purgatives, which do the same thing, and in addition often actually increase the constipation for which they are taken. In this type of case the patient may complain of swelling or "tumour" which arises from time to time in the iliac region, or she may simply describe it as "bloating".

Somebody has said that all women are constipated, and there is just enough truth in the saying to make it a first-class wisecrack. I don't believe it is as generally realized that constipation can cause iliac pain. Nevertheless, it is surprising how frequently such pain will disappear under a course of colonic irrigations. Nor is it realized to what an extent roughage and purgatives are responsible for this symptom. The whole subject of constipation and its sequelæ lies under such a cloud of ignorance that this is not surprising. We ourselves are much to blame for this. It is so easy for us to prescribe a purgative when what the patient needs is advice on a new set of hygienic rules. It is so easy in these days of radio exhortation for the patient herself to fly to X-lax rather than exercise, to a tablet rather than the toilet.

If the patient with chronic right-sided pain is asked if she takes roughage in her diet or uses irritating purgatives a considerable number confess that they do. A surprisingly large number of these are relieved of their symptoms if put on an absolutely bland diet and taken off the irritating purge. Some are actually cured of their constipation: to such an extent that I feel constrained to lay down this axiom: *No woman should be operated upon for chronic right-sided pain until she has been put for three months on a bland diet, and had her constipation cleared up.* What makes me all the more insistent on this axiom is the fact that not one of the women whom I saw for this condition in 1944, not even those that had been operated upon, had been tried with a bland diet, and a considerable number were relieved when put on such a diet.

Roughage in the diet can also cause an acute abdominal condition. I saw once a young woman in three or four attacks of acute right-sided pain, in which I could not satisfy myself that the condition was appendicitis. She left Halifax and on her next attack was whisked to hospital for an emergency appendectomy. Three months later she had another attack, and continued to have such attacks until a wiser doctor put her on a bland diet. She has never had an attack since. I saw another woman in a similar attack about six weeks ago; the evening before she had eaten an unusual number of bran muffins.

Root neuritis.—In the October, 1924, issue of the *Canadian Medical Association Journal,* Gordon Murray described a clinical picture which he names "root neuritis", in which chronic iliac pain is the prominent feature. He arrived at this diagnosis in attempting to explain the origin of symptoms in those cases of chronic right-sided pain where a normal appendix was found at operation. This is the clinical picture as I understand it: The pain has been present more or less steadily for a considerable period of time—months, or years. It is a sharp, shooting pain, not crampy. It is

not accompanied by digestive disturbances such as anorexia, nausea, vomiting or change in the function of the bowels. It may radiate into the groin, upper thigh, gluteal or lumbar region. There is tenderness and often hyperæsthesia over the appendix region, but the tenderness is not increased when the recti muscles are put on the stretch. When the back is examined deep tenderness may be elicited at the point of emergence of the posterior primary divisions of the affected segmental nerve, D. 10, 11, 12 or L.1. Pressure on these points may produce the iliac pain of which the patient complains.

Since reading Murray's article I have examined all cases of chronic right-sided pain with this picture in mind, and in some of them have been able to demonstrate the nodal point —usually over the posterior primary division of D. 11. In three such cases I have injected the nodal point with 1% novocaine solution. In two the iliac tenderness disappeared, and in one it was not affected. With so small a number of cases I am not in a position to state any real opinion on the matter, except to say that I am quite sure that this concept of root neuritis does not explain more than a small number of these cases of chronic right-sided pain.

Chronic right-sided pain as a manifestation of a neurosis.—While one always hesitates to label a patient with chronic right-sided pain as a neurotic, it is a fact that many such patients present the stigmata of a neurosis. The bloating, the constipation, the sensation of an evanescent tumour in the side, the high-strung personality, the sleeplessness, and the often volunteered statement of the patient that she is "very nervous", all point to a psychic basis. Probably all of us, if we gazed at our navel long enough and with a sufficiently acute sensitivity, would become aware of vague abdominal discomforts, amounting at times to actual pain. The neurotic is a highly sensitized organism, acutely aware of every draft blowing against her ego, ready to grasp at any straw that will provide an escape from reality. Sensation that the normal person brushes off unconsciously, may actually reach the height of pain in her case.

All our training in the past has urged us to seek for the causation of pain in some physical derangement, but I think the day has come when we must also seek it in some psychic derangement. When we do I am convinced that a fair number of people now being operated upon will escape the knife and come under the psychiatrist's care. In any case, I believe that every patient with chronic right-sided pain in which a physical causation is not clear, should be seen by a psychiatrist before any operation is performed upon her.

Arising out of the foregoing argument, the following modus diagnostici suggests itself in any given case of chronic right-sided pain:

1. There is no hurry. Most of these cases have had their pain for years, and time can be taken to arrive at a diagnosis without any risk to the patient.

2. Unless the diagnosis is quite clear the patient should be sent into hospital for a thorough investigation which should include examination by a surgeon, a gynæcologist, a urologist, an internist and a psychiatrist. It is better to do a barium series, or a cystoscopic examination, or carry out a trial on a bland diet, or treat any constipation that is present, before any operation is done rather than after it has failed to relieve the pain.

3. If the pain is colicky in nature, lasting for a few days and clearing up for weeks or months; if it is associated with nausea, vomiting or any change in the action of the bowels; if the point of maximum tenderness is over McBurney's point and is increased when the right rectus is put on the stretch, and if there is a mild leucocytosis or a slight rise in temperature, one would be justified in making a diagnosis of appendicitis. Unless this type of clinical picture is present the case should be put through the investigation outlined in (2) above before any operation is done.

4. If the pain and tenderness are located definitely below McBurney's point; if the pain is worse just before and during the first days of menstruation, if there is a previous history of acute pelvic inflammatory disease, if there is menorrhagia or a vaginal discharge; if, when the ovary is caught between the fingers bimanually, the patient states categorically that that is the exact location of her pain; if there is deep dyspareunia which can be elicited by pressure into the posterior vaginal fornix under a retroverted uterus; or if there is a small tender mass in the right postero-lateral vaginal fornix, we may reasonably believe that there is something wrong with the female pelvic organs.

5. If the pain shoots into the groin, if there is tenderness in the costo-vertebral angle or over the bladder, and this is associated with any urinary symptoms or abnormal urinary findings, a cystoscopic examination should be done.

6. If the pain is present practically all the time and shoots into the groin, or down the leg, or into the back; if the tenderness is over McBurney's point but is not made worse when the rectus is on the stretch; if it is not affected by menstruation; it is unlikely to be due to either appendicitis or any female pelvic disorder. In such a case it is worth while searching for a tender nodal point over the posterior root branches of the lower dorsal and first lumbar spinal nerves. If such a tender point is found the effect of injecting it with local anæsthetic should be tried.

7. In most cases the result of a barium series will be negative, but if it reveals any evidence of bowel spasm, the patient should be given a three months' trial of a bland diet, and be taken off any irritating purge. The same procedure should be carried out if the patient is in the habit of eating roughage. This should be done before any operation is undertaken.

8. If the woman has been operated on for the condition without relief, no further operative procedures should be attempted without the greatest consideration, which should include a very thorough examination of all the systems and extensive consultation. It is my experience that once a woman has been operated upon for right-sided pain, the chances of any further surgery helping her are very slim indeed. This stands to reason. The surgeon who operated, if he were any kind of a surgeon at all, would have taken a good look around the lower abdomen. If he went in for the appendix and found it normal in appearance he would have examined the female pelvic organs; if he had done some pelvic operation he would have looked at the appendix.

9. When all the above methods of investigation and treatment have been tried without avail the case should be—unless she already has been—sent to a psychiatrist for investigation. All cases that present, in addition to the pain, bloating, constipation, "nervousness", sleeplessness, etc., should be seen by a psychiatrist at the very beginning of the investigation.

But when all this is done there will remain some cases that defeat us, cases in which a complete physical and psychic investigation reveals nothing to account for the symptoms, cases in which all our treatment will have failed. What shall we do with such? In the present state of our knowledge I believe that such patients will do better and be happier if we trust to placebos, and refuse absolutely to resort to the knife.

Before closing this somewhat barren dissertation I cannot forbear to make one or two observations regarding surgical intervention in general. I wonder if we are not permitting such intervention to get out of hand. I am certain that this is true of surgery of the lower female abdomen and pelvis: far too many women are being operated upon in this region without a really thorough preliminary investigation, and without obtaining relief. As I stated in my preamble, we allow anyone with a medical degree to have his surgical will on the human body. In addition we have permitted not only too much glamour but too disproportionate rewards to accrue to the surgeon. As a result too many of our starry-eyed medical students look forward to a surgical degree as the most enticing within the compass of medical endeavour. Recent enquiries made among medical officers now with the armed services of this country and the United States show that upwards of 25% are looking forward to a surgical career. This means that in the future even more surgery will be done, much of which will be inevitably of a meddlesome nature and without benefit to the patient.

Has not the time come when we should impose some sort of limitation on surgical intervention? One way to do this, of course, would be to deglamourize surgery and relegate the operator to the rewards and status of the plumber. There is a great deal to be said for such an idea—but short of that, might not we insist that, except in cases of emergency, the surgeon — of whatever type he be — should justify his proposed intervention before a group of his colleagues, consisting of—among others — an internist and a psychiatrist? Larger hospitals could achieve this by putting all but emergency surgical cases through a diagnostic clinic, set up specially for the purpose. I personally would welcome such a curtailment of my surgical liberty, and believe

that not only would patients benefit, but that I would learn a great deal from it.

Another salutary factor in lowering the amount of unnecessary surgery would be the institution of compulsory follow-ups on all surgical operations. How many hospitals in Canada have such a follow-up? None that I know of. But if every Canadian hospital where surgery is done insisted on such a procedure for at least a year on every patient operated upon for no matter what condition, and if the results were regularly discussed at our staff meetings and the moral pushed home, I am sure that not only would we get some very humbling surprises, but that out of that humility a truer surgical wisdom would evolve.

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RÉSUMÉ

Les femmes souffrant de douleur abdominale chronique située à droite sont opérées et réopérées beaucoup trop souvent à la légère. On ne doit pas se dépêcher pour opérer de telles malades; mieux vaut les observer longuement et attentivement, demandant au besoin les consultants jugés nécessaires. Les organes génito-urinaires et digestifs, les racines dorso-lombaires, le psychisme doivent être scrupuleusement interrogés avant de décider de l'opportunité d'une intervention. Les diagnostics les plus usités offrent des critères assez surs, mais il faut en faire la discussion différentielle. On interviendra lorsque le risque de se tromper aura été réduit au minimum. Dans le doute, on s'abstiendra et on soumettra le problême à un confrère médecin ou psychiâtre. Il semble que l'on doive songer à règlementer l'usage immodéré du scalpel et à instituer des comités hospitaliers consultatifs qui mettront un frein salutaire aux décisions intempestives des partisans de la chirurgie à outrance.

JEAN SAUCIER

THE PROBLEM OF THE DAMAGED ARTERY IN FORWARD SURGERY

By Major W. T. Mustard, R.C.A.M.C.

THE establishment of the Advanced Surgical Centre has altered considerably the problem of vascular surgery in war. The possibility of operating on cases of injury to major arteries within a few hours of wounding and the protective influence of modern debridement and of sulfonamides and penicillin, have reduced the necessity for immediate amputation and have encouraged the surgeon to observe a more conservative attitude than formerly towards the ischæmic limb. The observations contained in this paper are based on fifty cases.

Wounds of arteries may be divided into four groups: (1) complete division; (2) partial division; (3) traumatic thrombosis; (4) occlusion—partial or complete, due to: (*a*) spasm or (*b*) pressure.

1. *Complete division.*—When this occurs in the lower extremity proximal to the popliteal bifurcation the foot is cold, white, pulseless and insensitive and, unfortunately, ligation of the vessel is usually followed by gangrene of the limb. In the upper limb, on the contrary, if the division is proximal to the brachial bifurcation and the collaterals not completely destroyed, while the radial pulse may be absent the hand is still warm and amputation is rarely necessary.

In carrying out ligations the thrombus should be removed from both the proximal and the distal end of the vessel and the amount of bleeding from the distal end noted. If a proximal collateral is near the division, then it is wise to occlude the artery as close to it as possible by suture rather than ligation if the division is very close to the collateral. The following cases will illustrate this group.

CASE 1

Pte. F.B. (Canadian) (6-9-44). Fourteen-hour shell wound lower end of right femur with cold, white, pulseless and insensitive foot; condition very poor; upper end of popliteal artery approached through Hunter's canal and found to be lying free; ligated; distal end not found. Local sulfa and gauze drain after usual debridement; Tobruk splint and evacuated following day in fair condition. Amputation through lower third of femur at Base Hospital four days later.

CASE 2

Major D.H.D. (British) (26-10-44). Five-hour mortar wound left elbow; gutter wound left lower chest; compound right forearm; radical debridement of left cubital space with ligature of brachial artery where it was divided immediately proximal to bifurcation; ulnar nerve intact; median divided—distal end not located, radial not seen. Plaster with forearm straight to aid collateral circulation after local sulfa and gauze drain; gutter wound of chest laid wide open; right forearm incised and drained, plaster. Evacuated the following day with warm hand and flexible fingers.

2. *Incomplete division.*—In war wounds this lesion is more in the nature of a ragged laceration which only occasionally lends itself to repair. In the open wound immediate surgery is required and the artery should be ligated; if a thrombus is present it should be removed; the artery must not be ligated in continuity. If the wound is a small one, operation should be avoided unless: (*a*) general forward surgical principles demand wound excision; (*b*)

bleeding is taking place; (*c*) vascular failure of the extremity has already occurred.

CASE 3

CSM. R.T. (Canadian) (11-8-44). Six-hour large through and through wound right upper femur with cold, white, pulseless foot; anterior wound debrided and a large laceration present in the femoral artery at the lower end of Scarpa's triangle; artery divided and ligated; posterior wound debrided; local sulfonamide and gauze drain; Tobruk splint; condition poor. Following day two paravertebral blocks performed and patient nursed on face but was evacuated two days later with cold, white foot which would undoubtedly require amputation through the knee region.

CASE 4

L/Cpl. A.B. (Canadian) (10-1-45). Four-hour perforating wound left upper chest (MG); hæmothorax present, swelling below the clavicle and absent radial pulse; swelling rapidly increasing in size and general condition deteriorating despite resuscitation; excision of clavicle and a large laceration encountered in the subclavian vein lateral to the scalenus anticus. A finger was put in the laceration and on removing it there was a spurt of arterial blood—it was in fact an arteriovenous fistula; ligation of both artery and vein carried out and hæmothorax aspirated. Evacuated a few days later with a warm hand, returning motor and sensory function and general condition excellent.

3. *Traumatic thrombosis.*—The clinical picture presented by this lesion is similar to that seen in complete division and the cold white extremity demands surgical intervention whatever the nature of the wound. Spasm must be distinguished from this well defined pathological entity and it is our opinion that too often an incorrect diagnosis has led to unwarranted optimism. If the limb is warm the diagnosis in the closed wound loses its significance, but if it is cold, white and insensitive then the diagnosis becomes important and proved only at operation. If heparinization is possible, removal of the thrombus is the treatment of choice; in the absence of this anticoagulant thrombosis will recur despite removal and the involved segment must be resected.

CASE 5

Pte. L.K. (Canadian) (25-7-44). Eight-hour shell wound perforating soft tissue above knee posteriorly; foot cold and white; popliteal artery exposed through midline incision and lateral popliteal nerve found divided; pulsation present in artery about two inches above bifurcation then absent with a firm segment to bifurcation, no gross contusion of adventitia; artery opened distally through a small linear incision after clamping above and below and a firm thrombus about two inches in length removed; artery repaired and a good pulsation obtained beyond bifurcation, the foot becoming warm and pink; after a few hours the foot became cold and white and he was evacuated the following day for elective amputation at knee level. (No heparin was available at that time.)

CASE 6

Pte. M.W. (Canadian) (11-1-45). Five-hour multiple shell wounds; right sucking chest, compound right shoulder, compound right elbow, compound left femur; cold, white insensitive right hand with absent radial pulse; sucking chest closed and incision carried into shoulder wound and axillary artery exposed by dividing pectorals; a contusion was present in the third right part at the origin of the subscapular artery; pulsation above but none below; artery opened distally through small linear incision and a large thrombus removed; involved segment of artery resected; elbow debrided and thoraco-brachial applied; left thigh debrided and Tobruk splint applied. Two days later a line of demarcation formed above elbow and the arm was disarticulated through the shoulder joint.

4. *Occlusion.*—To distinguish between spasm and local tension is difficult; both occur in a closed wound and both may produce the same clinical picture.

(*a*) Partial occlusion in which the pulse may be diminished or absent with a warm extremity does not reqiure operation and the diagnosis need not be made.

(*b*) If occlusion is complete and the extremity cold and white, release of tension is indicated.

If spasm is present careful inspection of the artery should be carried out for thrombosis and if there is doubt the artery should be opened. Distension of the arterial lumen with heparin solution may relieve the spasm; careful periarterial stripping may be performed; we have not done arterectomy for this condition.

CASE 7

Pte. H.J.C. (Canadian) (15-8-44). Ten-hour gunshot wound perforating left popliteal space without fracture; foot cold, white and pulseless; popliteal space opened and fascia over vessels divided with evacuation of hæmatoma; the posterior tibial had been severed; it was ligated; fascia left open and skin approximated; foot became warm and pink. Patient evacuated following day with pulsation in dorsalis pedis and warm foot.

CASE 8

Pte. K. (Polish Army) (5-9-44). Six-hour compound lower end of left humerus with impaired sensation of glove type, absent radial pulse but warm hand; wound debrided and cubital space opened; no pulsation in vessel on palpation; after division of lacertus and removal of clot pulsation returned in both radial and ulnar arteries; nerves seen were intact; local sulfonamide and gauze drain. Plaster applied. Evacuated following day with warm hand; radial artery not felt because of plaster.

In the 50 cases explored as a primary operation we have encountered (1) complete division—34 cases; (2) incomplete division—6 cases; (3) traumatic thrombosis—4 cases; (4) complete occlusion—(*a*) spasm—1 case; (*b*) pressure—5 cases.

From this experience it may be seen that a lesion of the main artery to a limb usually requires ligation. With the collateral circulation damaged and acute vascular failure of the ex-

tremity already present a matter of hours, this ligation has resulted in the vast majority of cases in amputation of the lower limb and, in a few instances, of the upper. We became so impressed with this fact that it was felt that some attempt should be made to restore the circulation to the extremity by artificial means. End to end anastomosis and venous graft we have found impractical as a primary procedure; we have not attempted suturing fascia or muscle over a laceration of an artery but it is our opinion that this would be a dangerous procedure, particularly in an extensive tear. Glass cannulæ were inserted into the ends of a severed artery and across lacerations in three cases; in the absence of heparin, thrombosis occurred. With the aid of heparin this procedure is feasible and has been carried out successfully. It was felt unwise to leave these smooth tubes in the arterial lumen and they were replaced by venous graft after two days; on removal of the tubes in no case was thrombosis present. It is thought that if one were able to leave the tube in the vessel for a week or more collateral circulation might develop to such an extent that secondary graft would be unnecessary, particularly if the tube were of smaller calibre than the vessel thus allowing stimulation of the collateral circulation.

Case 9

Pte. E.D.B. (Canadian) (29-10-44). Ten-hour penetrating flesh wound right thigh (shell) with cold, white pulseless foot; incision through lower end of Hunter's canal and the femoral artery found severed as it entered the popliteal space; thrombus removed from divided ends and a glass cannula inserted into the lumen to bridge the gap; regional and general heparinization carried out and the foot became warm and pink. Two days later the tube was removed (there was not the slightest thrombus formation) and the femoral vein used as an end graft; on releasing the clamps the distal suture line was poor so that the artery was opened distal to this and a cannula inserted across the suture line. The foot remained warm and pink, the patient remained heparinized and six days later the tube was removed through the incision in the artery and the artery sutured. There again was no evidence of thrombosis. It is questionable if, after removal of the tube, the graft was carrying much of the circulation. Two months later sensation had returned to the foot; there was some œdema but the patient stated he was walking.

Experience with this form of artificial restoration of the circulation will be the subject of a later communication. The conclusion from this survey of arterial wounds in the forward areas is that ligation remains the operation of choice. When complete or partial division or traumatic thrombosis occurs in the resuscitated patient in the absence of gross muscle damage, restoration of the limb circulation may be attempted by some type of operation to bridge the gap.

These observations are purely factual and have been made while working in a field surgical unit. There has been no opportunity for a study of the modern literature on this subject. The help and encouragement of Brigadier A. E. Porritt, Consulting Surgeon, 21 Army Group and of Brig. J. A. MacFarlane, O.B.E., Consulting Surgeon Canadian Army is gratefully acknowledged. Capt. K. E. G. Wilson, my assistant, has shared the responsibility of these cases with me and the men in our Field Surgical Unit have given me whole hearted assistance.

TRAUMATIC ARTERIAL SPASM

(Report of a Case)

By Surgeon-Commander W. C. MacKenzie, R.C.N.V.R.
and
Surgeon-Lieutenant Commander W. G. Breckenridge, R.C.N.V.R.

SEVERANCE, rupture or any other actual damage to the wall of an artery has for many years been accepted as causing spasm of the muscular coat of the vessel.[12] In addition the experience of more recent observers has led us to believe that trauma to an artery insufficient to damage any of its coats, such as may be caused by the close passage of a missile or by the pressure of a displaced bone fragment (concussion), may produce functional disturbance of its course by spasm.[1, 2, 8, 12] This entity we feel is well demonstrated in the following case.

Case Report

A stoker, aged 23 years, while handling lines aboard ship at approximately 5 p.m., October 17, 1943, accidentally caught his left leg in the bight of a rope, the leg being jammed against the guard rail. He received very adequate first aid, the leg was splinted laterally and posteriorly and he was transported immediately to hospital.

Examination on admission to the Royal Canadian Naval Hospital, Halifax, at 6 p.m., revealed slight medial angulation of the lower third of the left leg with swelling of the mid-calf and lower leg proximal to the fracture site; the swelling extended up to the knee with a 1½ to 2 inch band of bruising or brush-burn almost encircling the calf obliquely at the level of the fracture site, approximately 6 inches above the ankle joint.

Radiographs revealed a transverse fracture of the tibia and fibula at the level of the above mentioned abrasion, that is, the junction of the lower and middle thirds of the leg.

The leg was immobilized in a pillow splint and the patient admitted to a surgical ward by the Duty Medical Officer. Examination there revealed nothing abnormal about the foot and the patient appeared comfortable. The attending surgeon was notified and preparations were made for reduction of the fracture in the operating room with the intention of applying a Stader splint.

On preoperative examination at 8.30 p.m., two and a half hours after admission, we were struck immediately by the marble pallor of the toes blending into a dusky cyanosis. This cyanotic area extended over the dorsum of the foot to a transverse line 1½ inches above the malleoli giving the appearance of an ankle sock. There was loss of sensation over the dorsum of the foot, and it was cold to the touch. Pulsation was absent in the dorsalis pedis and posterior tibial vessels, and the patient was complaining of severe pain in the foot. There was swelling of the calf proximal to the fracture site, extending to the knee and limited in extension upwards by lateral fascial expansions at the knee.

Arterial block was an obvious contraindication to the use of external fixation. With a tentative diagnosis of traumatic vascular spasm, our efforts were bent towards early relief of traumatizing factors. Accordingly, the patient was given a spinal anæsthetic, which appeared to give transitory improvement in the colour and local temperature of the left foot. Correction of the position of the fracture fragments was accomplished by inserting a Kirschner wire through the os calcis and ten pounds of skeletal traction was applied, the leg being supported on a Braun splint with the foot fixed in neutral position by a posterior plaster mould. No visible improvement was apparent at the end of the procedure. A paravertebral lumbar sympathetic block (left) was performed with increase of local temperature of the entire lower extremity down to the fracture site but no demonstrable change in colour or temperature of the foot.

Consideration was given to exploration of the posterior vessels, and splitting the fascia of the mid-calf to relieve tension, but it was felt more might be gained by time. Accordingly, the foot was protected with cotton wool and packed carefully with four ice-bags and the foot of the bed elevated.

October 18.—The foot appeared more cyanosed. A paravertebral lumbar sympathetic block was repeated, with temperature increase down to the fracture site but no obvious improvement observed in the foot. Papaverine hydrochloride was given gr. ¼ intravenously t.i.d. without effect.

October 19.—Paravertebral block repeated, with temperature changes in the upper portion of the leg proximal to the fracture site but no improvement in the foot.

October 20.—Refrigeration (ice packs) discontinued in the morning. The toes felt warmer than the foot and were slightly pink and a suggestion of pain was observed on removal of the ice. As time went on slight œdema appeared, accompanied by mottling of the toes. The general condition of the patient was excellent, with satisfactory urinary output.

October 21.—Temperature 101.4°; pulse 118. The entire foot was purple and œdematous but of a lighter hue than the preceding day. Small blisters over the dorsum of the foot suggestive of revascularization were noted, and on that basis amputation was postponed in the fact of toxic manifestations, and chemotherapy was instituted. The temperature subsided satisfactorily with chemotherapy during the succeeding four days, the foot became progressively darker and mummification appeared on the plantar surfaces of all toes. Sulfathiazole was discontinued on October 26, when the patient became dizzy and nauseated.

October 29.—The dorsum of the left foot suddenly became light pinkish in colour, suggestive of a sudden release of spasm and return of circulation. Simultaneously, however, the toes appeared more mummified than at any previous time.

October 30.—A guillotine amputation was performed 3 inches above the fracture site to avoid traumatized and devitalized skin edges. All large vessels bled freely and

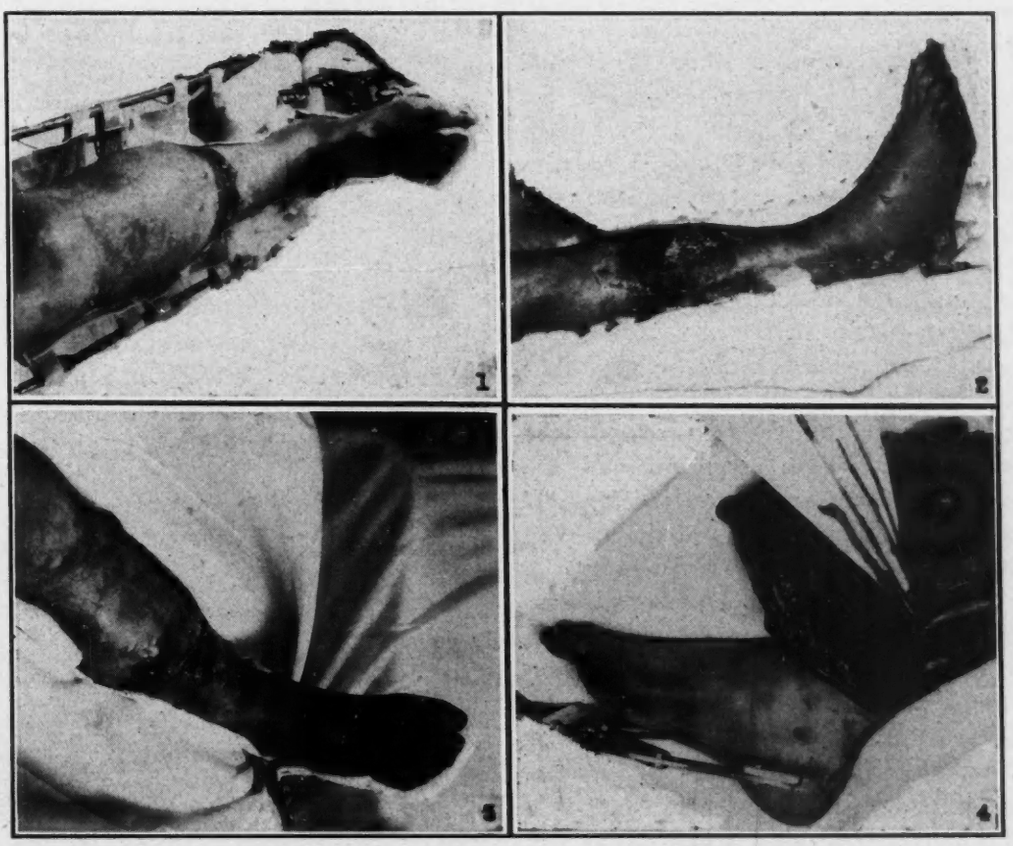

Fig. 1.—Twenty-four hours after injury. **Fig. 2.**—Five days after injury. **Fig. 3.**—Thirteen days after injury. **Fig. 4.**—Amputated extremity showing fine probes in the spastic vessels.

collateral circulation appeared adequate. Some early ischæmic changes were noted at the site of amputation.

The amputated limb was examined carefully with complete dissection of the posterior vessels. All muscle tissue was grey and devitalized; no obvious necrosis noted. The posterior vessels were string-like, apparently still in complete spasm. No evidence of laceration at the fracture site could be demonstrated and it was possible to pass fine probes easily throughout the exposed length of vessels past the fracture site. Microscopic sections were not obtained.

Skin traction was applied on the third postoperative day and maintained for a period of three weeks without success. Re-amputation at minimal below-knee level was performed on December 26.

SUMMARY

A single case of traumatic arterial spasm occurring after fracture of the tibia and fibula is presented and corroborated by postoperative findings.

Our purpose in reporting the case, our first of this kind, is not to initiate any lengthy discussion of the syndrome, so adequately covered in Cohen's[1] paper, but we are anxious to hear of other similar experiences and the methods of treatment adopted. Certainly our approach of watchful waiting in October, 1943, was not enough.

Confronted with a similar case now, a year later, we believe active measures should be instituted early to obtain sympathetic release,[14] warming the body while cooling the injured limb, the use of antispasmodics, e.g., papaverine, and paravertebral novocaine injection of the sympathetic ganglia.[13] Arterial spasm relaxes slowly and usually persists for at least 24 hours, but if serious complications are to be avoided, circulation should be restored within six to eight hours.[12] Failing the return of circulation after non-operative measures in the above-mentioned time, the affected vessels should be explored; the removal of surrounding clot or simply exposing the artery may relieve the spasm, or the diagnosis may have been erroneous and the artery may be found torn but not bleeding. If the spasm still persists, resection of the affected part of the artery should be carried out.

We could not help but realize the self-condemnation one might feel at having treated such a case with plaster or any other type of fixation in the first few hours immediately following injury when the entity described above had not yet manifested itself.

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RÉSUMÉ

Présentation d'un cas de spasme artériel traumatique, confirmé par l'examen post-opératoire de la pièce. L'expectative armée n'est probablement pas suffisante en pareil cas; on doit agir tôt et essayer d'obtenir précocement le relâchement du sympathique. La circulation artérielle doit être rétablie en moins de 8 heures; après ce temps on devra explorer les vaisseaux suspects, enlever les causes de spasme, et au besoin, réséquer partiellement le vaisseau. On devra se méfier des immobilisations précoces.

JEAN SAUCIER

PULMONARY EMBOLISM*

By Neil Feeney, M.D.

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PULMONARY embolism is not a new disease, but a new interest has developed in the study of its causes and treatment. In the past it has been the surgeons almost exclusively who considered it, and rightly so because it was found, for example, that 6% of all postoperative deaths coming to autopsy at a large clinic were due to pulmonary embolism, and further, 50% of all important postoperative complications are due to emboli in the lungs. That we, as physicians, should become conscious of its significance can be realized when in 1940 there were reported from an autopsy study at the Massachusetts General Hospital[1] 370 cases of pulmonary embolism and infarction of which 60% were medical cases and only 40% were postoperative. These figures are highly significant and need no further elaboration. I merely want to add that if minor attacks of embolism to the lungs were included the incidence would be higher. These minor attacks are important because they frequently are the precursors of major fatal attacks.

The thrombi that plug the pulmonary arteries must come from the right side of the heart or the systemic veins. The former is a

* Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Medicine, Toronto, Ontario, May 24, 1944.

rare cause, the latter a very frequent one. The commonest sites of the thrombi in order of frequency are: the iliac vein, the femoral vein, the pelvic veins, the prostatic venous plexus, the vena cava and rarely the right auricle. Pooling and coagulation of the blood in the deep veins of the leg with extension or propagation of the thrombus in the popliteal and femoral veins are the essential factor in 90% of cases of pulmonary embolism. Homans[2] called this a "quiet thrombophlebitis", because it produced very few local symptoms. The walls of the veins are very little, if at all, damaged, the thrombus that forms is insecure and may result in embolism. Furthermore, and what is more frequent, in a slow stream a propagating thrombus which may reach great lengths forms from the original thrombus. It is apt to break away and cause fatal pulmonary embolism. The septic form of thrombophlebitis rarely results in embolism.

What are some of the factors that lead to thrombosis in veins? First, slowing of the venous return from the lower limbs. This is most often found in a patient at complete bed rest, particularly in medical cases. Furthermore, the presence of cardiac insufficiency slows the stream still more, and as a result, pulmonary embolism is twice as common in these patients. It would be a mistake, however, to believe that thrombophlebitis or phlebothrombosis does not occur in apparently healthy and active individuals. In 1936 N. W. Barker[3] described cases of primary idiopathic thrombophlebitis affecting active individuals. Secondly, changes in the blood, with particular reference to the factors which retard or accelerate coagulation. These are poorly understood, but anæmia and a rapid clot retraction time favour thrombosis. Thirdly, trauma, such as slight injuries, or fractures, childbirth or an abdominal operation. Certain operations are more frequently followed by thrombosis than others. For instance, after resection of the stomach the incidence is relatively high, but after thyroidectomy it is rare.

One would think that the symptoms and signs of this disease require little elaboration. Pain in the side of the chest, bloody sputum, and signs of pleuritis and consolidation have for years been recognized as the classical evidences. Likewise, very marked dyspnœa and cyanosis are frequently described as outstanding signs. However, it is much more common to be confronted with the signs of shock, namely, faintness, pallor, sweating, low blood pressure, vomiting and acceleration of the pulse. Pain in the chest, with typical anginal radiation, or a feeling of oppression across the chest are not uncommon. Many times, particularly with small emboli, the only symptoms are a slight feeling of weakness, tachycardia and slight fever. These are storm warnings that should not be dismissed lightly. If a small embolus enters the lung, infarction may not take place and then the physical signs of consolidation and the typical x-ray picture will be absent. When a large thrombus blocks

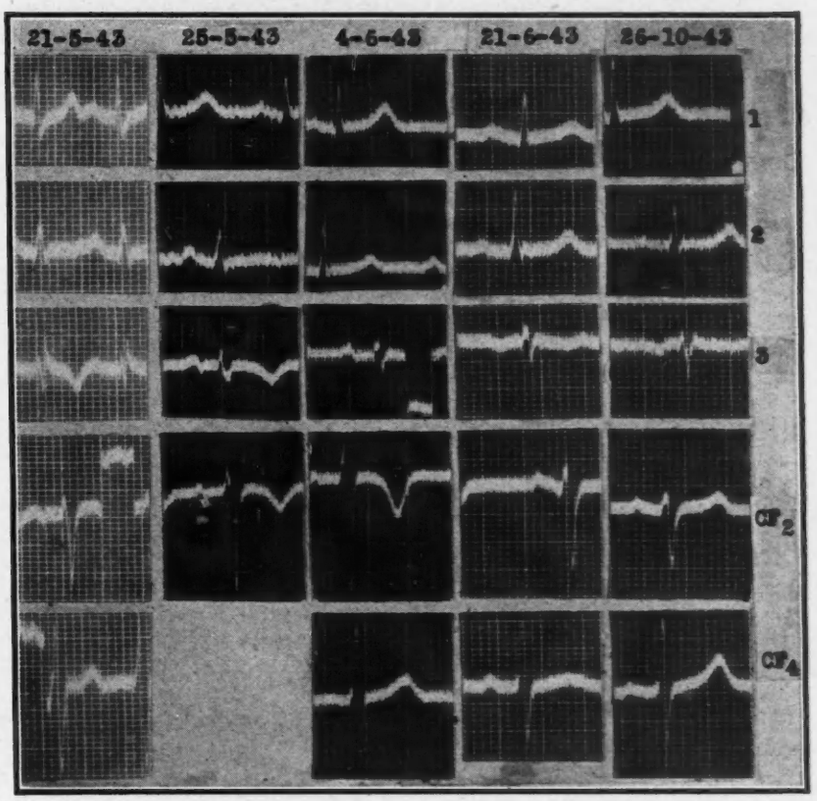

Fig. 1.—Serial electrocardiograms of Case 1. First record on May 21, 1943, shows all the characteristic changes described by White and Barnes. Subsequent tracings showed the gradual disappearance of all the abnormalities. On October 26, the last tracing, only left axis deviation is present.

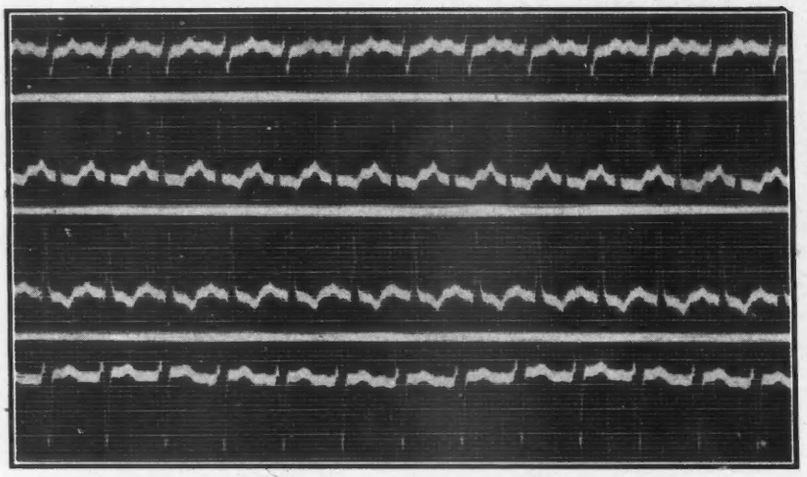

Fig. 2.—Tracing taken 24 hours after the acute episode (Case 2). Non-specific changes of displaced ST segment in Leads 2 and 3 are noted. Right axis deviation is also present.

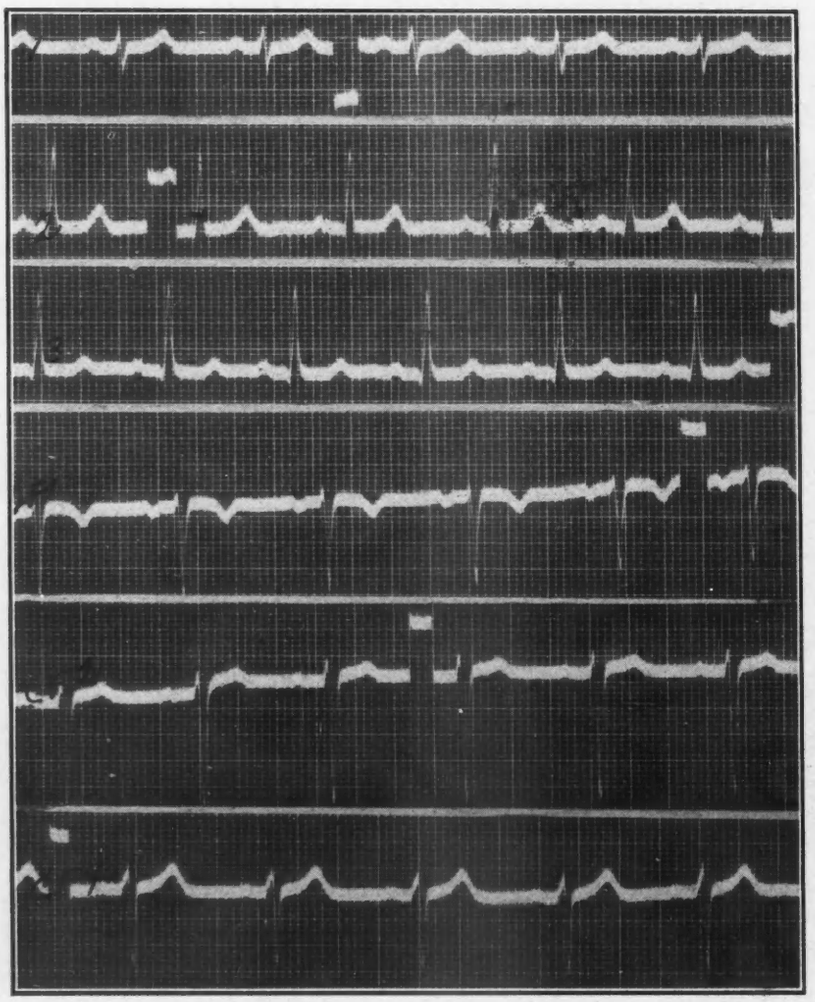

Fig. 3. (Case 2).—Tracing taken 3 months after pulmonary embolism shows only inversion of T in CF_2, in addition to right axis deviation. This is probably normal for her build.

the pulmonary artery the condition called acute cor pulmonale may be produced, and then the usual signs in the heart are, according to White[4] (1) marked pulsation in the 2nd and 3rd interspace to the left of the sternum; (2) a systolic murmur in the 3rd left interspace; (3) marked accentuation of the pulmonic second sound; (4) friction rub in the same area; (5) decreased pulsation and fulness in the veins of the neck; (6) marked cyanosis.

The electrocardiographic signs are of interest. In 1935 and 1936, White[4] and Barnes[5] independently described the changes that occur in pulmonary embolism. Without going into too great detail, the following were the main characteristics. (1) A prominent S in Lead 1. (2) A take-off of ST_2 below the isoelectric line. (3) Biphasic or upright T_2. (4) Normal level or slight elevation of RT_3. (5) Inversion of T_3. (6) Presence of prominent Q_3. (7) Inversion of T in CF_2 or CF_4. These changes in the electrocardiogram are probably brought about by ischæmia due to tremendous increase in right intraventricular pressure and a coincident decrease in coronary circulation. Hence it is seen that variations in the electrocardiographic pattern will take place depending upon the amount of strain on the right ventricle. So I feel that in general we may get three types of tracings: (1) the one described by White and Barnes, in severe attacks; (2) a non-specific type with few or many abnormalities in moderate attacks and (3) a normal tracing in minor attacks. These are well illustrated in the following cases.

CASE 1

A patient, aged 54, entered the hospital with a Type III pneumococcus pneumonia. He was very sick but responded to treatment. Eight days after admission he was seized with an intense sense of oppression over the upper sternum. The respiratory rate rose to 50 per minute. There was marked cyanosis. The extremities were cold and he perspired profusely. The blood pressure fell to 88/60 and the pulse rate increased to 136 per minute. A friction rub was heard over the cardiac region close to the left border of the sternum. He had suffered from varicose veins in the past but no thrombophlebitis was evident. The electrocardiograms were of interest, showing the changes described by White and Barnes as typical of acute cor pulmonale. He was given dicoumarol and made an excellent recovery. At this date he is free from symptoms and his electrocardiogram is normal. There was no doubt that this man suffered from pulmonary embolism (Fig. 1).

CASE 2

A woman of 39 was thought to be suffering from pneumonia. On examination there was a large abdominal tumour which was diagnosed as a uterine fibroid. The first day she was allowed up she became suddenly weak, had a sense of oppression over the chest but only very slight pain. The blood pressure fell and the pulse rate rose. At the base of the right lung behind there was dullness with a few râles but one could not be certain whether or not these signs were due to the original pneumonia. Her electrocardiograms showed changes which were not particularly specific of acute cor pulmonale (Fig. 2). She was treated with dicoumarol and subsequently an operation was performed for the removal of a calcified fibroid. During her stay in hospital there developed bilateral thrombophlebitis with swelling of the legs. It was quite apparent that she suffered from pulmonary embolism and at the present time her electrocardiogram is normal excepting for an inverted T in CF_1 (Fig. 3).

CASE 3

A woman of 64 was admitted for vaginal hysterectomy. She had bilateral varicose veins and varicosities around the vulva. Operation was performed on October 25, 1941. Thirteen days later whilst going to the bathroom she felt faint and had pain at the lower end of the sternum. She was pale, cyanosed and the skin was cold. The blood pressure fell to 96/60. At the base of the right lung there were a few râles. A day later the electrocardiogram showed non-specific changes. The diagnosis of pulmonary embolism was made. She was given heparin intramuscularly and she made an uneventful recovery. An electrocardiogram taken recently was normal (Fig. 4).

CASE 4

A man of 72 was admitted to the genito-urinary ward for prostatectomy. On February 2, 1944, a first stage was performed. Three days later there was an elevation in pulse rate, and the temperature rose to 100°. This lasted two days. An x-ray of the chest was interpreted as showing changes consistent with bronchopneumonia in the right lower lobe. On February 20, he had severe pain in the right side of his chest. The temperature rose to 100°. The following day an x-ray showed a shadow in the left lower lobe consistent with pulmonary infarction. An electrocardiogram on February 22 was normal; one taken on February 28 showed slight inversion of T in CF_2; on April 25, an electrocardiogram was normal but slightly different from the first one. It was quite possible that electrocardiographic changes were missed in the interval between the first and second tracing. The coagulogram was normal. A diagnosis of pulmonary embolism was made but no specific treatment was given. Some time afterwards the prostate gland was removed but following this there developed a lung abscess in the lower portion of the left upper lobe. He made a complete recovery.

This is a good illustration of a patient suffering from pulmonary embolism in which very few changes if any, appeared in the electrocardiogram (Fig. 5).

Once the diagnosis of pulmonary embolism has been suspected without visible evidence of thrombophlebitis, and this is the usual story,

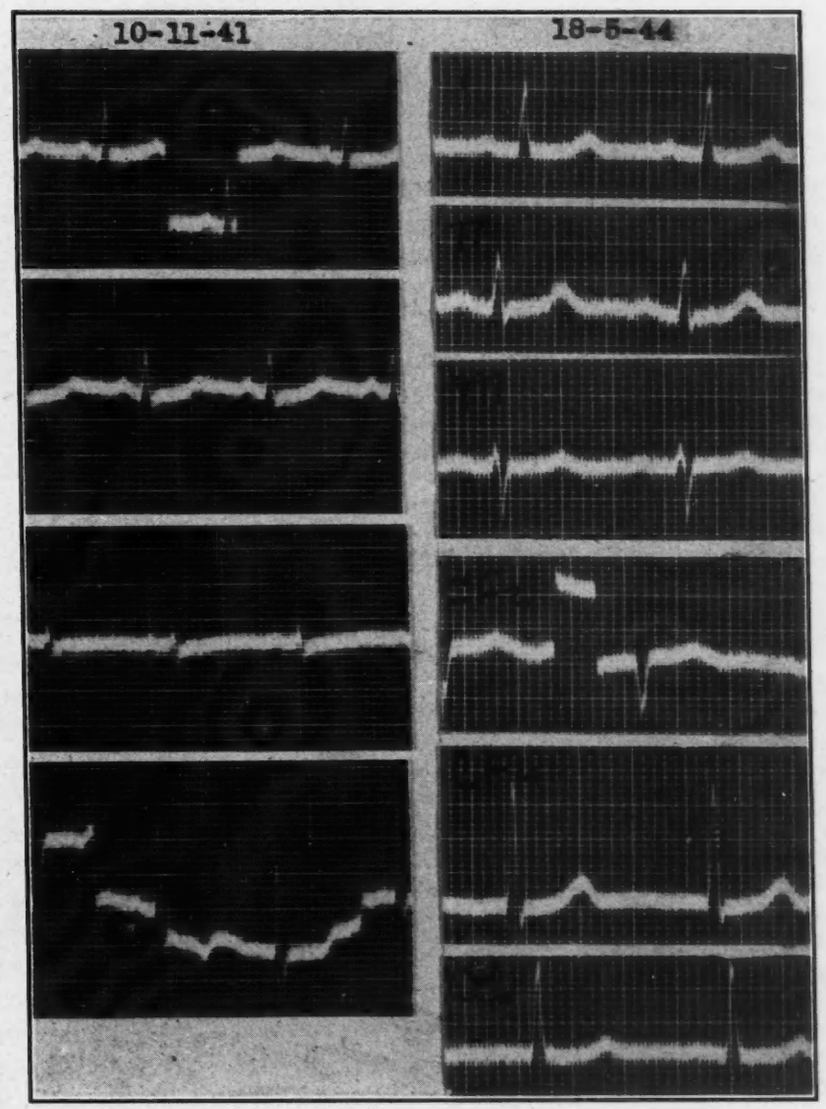

Fig. 4. (Case 3).—First record on November 10, 1941, taken 24 hours after attack of pulmonary embolism. There is ST displacement in Leads 1, 2, 3 and 4F. The tracing taken on May 18, 1944, is normal.

it is important to keep in mind the silent thrombophlebitis of the leg. Homans,[2] who has made an exhaustive study of the condition, feels that there is only one sign of importance in its recognition, and that is pain 4 or 5 inches above the tendo Achilles on dorsiflexion of the foot. It is a valuable sign not to be omitted from the examination, and calls for immediate treatment. There are many conditions to be differentiated from pulmonary embolism, such as spontaneous pneumothorax, massive atelectasis, lobar pneumonia, coronary thrombosis, acute cholecystitis, ruptured peptic ulcer, and others.

The prognosis is extremely difficult to determine. As in myocardial infarction, where the presence of a diseased artery, a thin cardiac muscle or a mural thrombus always carries with it dire possibilities, so in pulmonary embolism, which is nearly always due to thrombi in the peripheral veins, the loosening of a fresh clot that puts intolerable strain on the right ventricle may result in sudden death. I know of no method whereby one can tell what will be the outcome of even a mild attack of pulmonary embolism. Recognition of the condition and intelligent application of treatment are the best safeguards from an unhappy result.

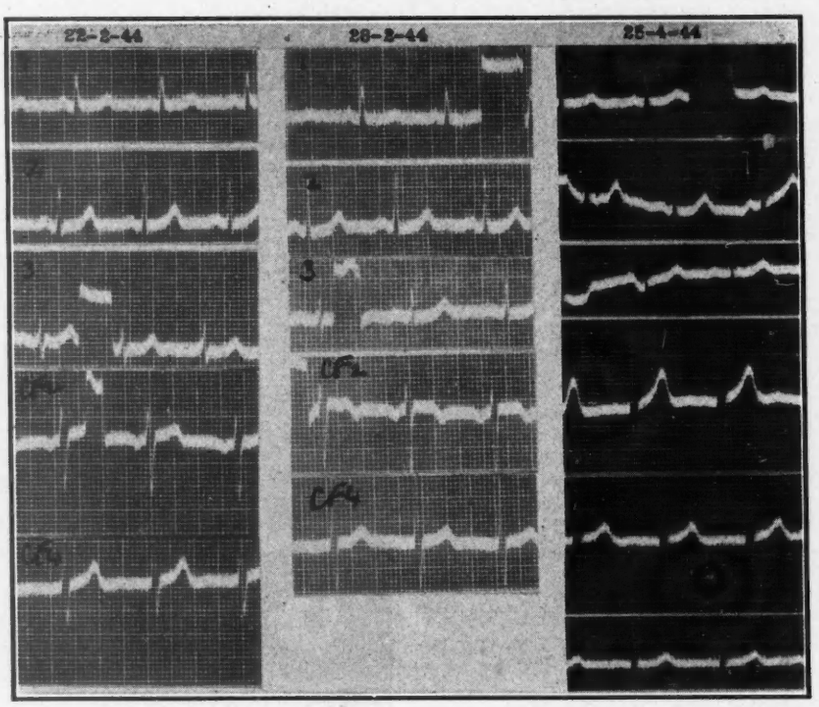

Fig. 5. (Case 4).—The first record on February 22, 1944, was normal. This was 2 days after attack. On February 28 the only change is a slight negative phase in T of CF_2. On April 25 the tracing was perfectly normal.

TREATMENT

The treatment of pulmonary embolism might be considered under three headings. First, the prevention of venous thrombosis and embolism in patients at bed-rest, whether they be medical or surgical, who have never had these conditions before. Theoretically this consists in controlling the factors which increase coagulability of the blood, and preventing slowing of the venous return from the legs. The first is to be combated by controlling dehydration and anæmia. It may be thought too much to ask for a coagulogram in all cases under our care but in patients over 40 years who are to have an abdominal operation, and particularly if there is evidence of heart disease, this may be helpful. If abnormal, the use of anti-coagulants is advised.

Now, the return flow of blood from the lower limbs depends upon a number of factors, but none is so important as the active muscular contractions and muscular tone which squeeze the blood along towards the heart. Their failure certainly slow the blood stream. The position in bed of the ordinary hospital patient with the knees flexed, the thighs flexed on the abdomen, and the head raised is an ideal one to slow the venous return from the legs. Hence we should attempt to keep patients in bed as short a time as possible before and after operation, and even after an acute illness. When they must remain in bed, as after an operation, or with medical cases, if the patient is over 40 years of age the Trendelenburg position for 48 hours, deep breathing, inhalation of carbon dioxide frequently during the day, coughing, massage and active and passive movements of the legs all tend to speed the venous flow.

Under the second heading is the treatment of, first, patients who have had one attack of pulmonary embolism or infarction, and have survived; second, patients who postoperatively or during an illness develop thrombophlebitis;

third, patients who had thrombophlebitis or pulmonary embolism complicating a previous operation or from any other cause. To the patients in these three categories there may be two methods of attack; (*a*) surgical, which means tying off the vein, which holds the propagating thrombus, at its proximal extremity. If we could be sure where that thrombus resides, and that it was the only one, this would be a good method of treatment, but I am afraid such is not the case. However, in all patients such a procedure must be considered seriously. (b) The use of anti-coagulants. Heparin has been described so adequately that I shall not discuss its well-known attributes. There are difficulties attending its continued use which are insurmountable.

Dicoumarol has been the prominent anti-coagulant during the past year. The fact that it can be given by mouth has added to its usefulness. It should only be used in hospital and when proper blood studies can be made on the patient. Dicoumarol usually causes a rise in the prothrombin time, which is normally about 20 seconds. An attempt is made to raise it to 40 or 50 seconds. Patients vary in their susceptibility to the drug, hence there is no set way of giving the optimum amount. After dicoumarol is given the prothrombin time rises in 24 to 72 hours. Because of this slow rise heparin may be used for the first 48 hours. Usually 200 mgm. of dicoumarol are given the first day, and 200 mgm. the second day. Daily determination of the prothrombin time is then begun, and a daily dose of 200 mgm. is given until the prothrombin time reaches 35 seconds. Any day it falls below that level this dose is given. The elevation of prothrombin time is maintained until the patient is ambulatory. There is some risk of bleeding in postoperative cases, but this should not deter us from using dicoumarol. The hæmorrhage can usually be controlled by transfusion of fresh whole blood, or large doses of vitamin K. Bleeding usually occurs from the site of operation or an ulcerated area. The contraindications to the use of dicoumarol are (1) purpura; (2) existing prothrombin deficiency such as may occur in jaundice or hepatic disease; (3) subacute bacterial endocarditis; (4) renal insufficiency.

The third heading is treatment of the acute attack of pulmonary embolism. The minor attacks have minor symptoms which require little except drugs to relieve discomfort. In the major attacks the patient requires relief from symptoms. Some have used papaverine intravenously to relax spasm of the pulmonary artery. I am not sure whether or not it is effective. Morphine to relieve pain and discomfort, oxygen to relieve cyanosis and blood-letting to reduce marked venous distension are all worth while.

SUMMARY

Pulmonary embolism of the non-fatal type is much more common than we suspect. Fatal types are almost always preceded by minor attacks. The importance of silent thrombophlebitis is stressed. The diagnosis is not difficult if we think of and look for the condition. Treatment with dicoumarol is on a rational basis, but must be used carefully.

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1414 Drummond St.

Cotton has been adopted as the preferred suture material for surgical use at a 750 bed hospital in the southwest Pacific area. With occasional exceptions, it has been used routinely. The series reported upon comprises 534 major and minor operations other than upon battle casualties, and 237 operations upon battle casualties. The latter group in particular includes many cases in which the wounds were extensively contaminated or grossly infected at the time of initial operation. Cotton suture material may be employed safely and with highly satisfactory results in the surgery of war wounds, without regard either to their degree of contamination and infection or to the elapse of time between injury and the institution of definitive surgery.—R. S. Sparkmen, Cotton sutures in surgery of warfare, *Surgery*, **17**: 73, 1945.

CHROMOBLASTOMYCOSIS DUE TO A NEW SPECIES OF FUNGUS

(First Canadian Case)

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CHROMOBLASTOMYCOSIS (chrblm). is a superficial mycosis featured by either verrucous, papillomatous, tuberculoid, syphiloid, psoriasiform, cicatricial or elephantiasiform lesions of the skin, and by the presence of yeast bodies in the afflicted tissues, which yield dark brown or black colonies, when cultivated on the usual solid media. In its clinical and histological characters it closely resembles the Gilchrist type of common blastomycosis, from which it can, therefore, be distinguished only through cultivation of the pathogenic fungus (Pardo-Castello, Leon and Trespalacios[1]).

Chrblm. was first described in Brazil by Pedroso (1911) under the name of "black blastomycosis" in view of the dark colour of the yeast cells found in the tissues, but credit for the first cultivation of the fungus belongs to Medlar (1915), who isolated it from Lane's case. Since then and up to 1941 a number of 125 (110 certain) cases have been reported in many countries and were tabulated by Weidman and Rosenthal.[2] To that number must be added 11 cases from Cuba (Pardo-Castello *et al.*,[1] 1942), 2 from South Africa (Simson, Harington and Barnetson,[3] 1943),* 3 new cases from the United States, 2 by Moore, Cooper and Weiss,[4] 1943 and 1 by Binford, Hess and Emmons,[5] 1944, and our own. The latter is the 11th in continental North America and the first in Canada. Almost half of all cases were observed in Brazil.

Most lesions were encountered in farm workers on the lower extremities; in only about 10% the lesions were elswhere: in the face, on the upper extremities, the neck, the chest, the back or the buttock. In almost all cases one region only was affected; in a very few there were two separate lesions.

The commonest form seems to be the verrucous and papillomatous type; the latter not only resembles ordinary blastomycosis, but can be mistaken for tuberculous and even carcinomatous lesions. It shows as more or less large and elevated cauliflower-like tumours of light brown to dark red or violaceous colour; the lesions may be soft or hard, moist or dry, but are most often oozing, partly macerated, with a stale, nauseating smell; there is no true suppuration, but some pus droplets may appear after squeezing. The margins of the tumours are sharp and the neighbouring skin is normal. The lesions rise abruptly and are seldom overhanging.

Histological examination reveals either marked hyperplasia of epidermis with hyperkeratosis and acanthosis in the papillomatous and verrucous types, or only moderate epidermal thickening in the other types. The dermis, into which extend deep and large epidermal papillæ, shows an infiltrate of polymorphonuclears, eosinophiles, lymphocytes and plasmocytes and macrophages; miliary abscesses and tubercular-like follicles with slightly atypical Langhans giant cells are generally present. It is chiefly in the latter structures that the pathognomonic brown or greenish yeasts were encountered.

The pathogenic agent appears as brownish yeast cells of from 8 to 15 μ, which may be single, but are more often grouped in more or less large clusters. The cells are septate and all authors agree that there was no budding. In a few instances a sprouting mycelium was found in the scales or in the pus.

ETIOLOGY

Two fungi are considered to be responsible for chrblm.: Hormodendrum Pedrosoi and Phialophora verrucosa. It was first believed, that the former was peculiar to South America and gave papillomatous lesions, whereas the latter was restricted to North America and gave less hyperplastic lesions. It is now established that either type may be found anywhere, that similar lesions can be induced by either species and that the same species can give rise to any type of lesion. Hormodendrum and Phialophora were first thought to be two different species, but recent studies by Emmons and by Carriòn, which were confirmed by Conant and by Moore, showed that the characteristic Phialophora-type of sporulation may also be found in Hormodendrum and that there may be some relationship between both.

After an exhaustive discussion Carriòn[6] arrived at the conclusion, that Phialophora ver-

* From the 6 cases reported by these authors only 2 were ascertained, through cultivation of the respective fungi, to belong definitely to chrblm.

rucosa and Hormodendrum Pedrosoi are species belonging to the same genus, for which he proposes the name: Fonsecæa Pedrosoi (Negroni, 1936, emend.). Emmons[5] concurs with Carriòn's opinion, that Hormondendrum and Phialophora are closely related, but believes that for reasons of priority the generic name should be Phialophora. Considering the authority and experience of both these authors it is difficult to take sides in this debate on mycological nomenclature and the genus will, therefore, in this paper provisionally be referred to as: Fonsecæa-Phialophora.

As to the therapeutical response, it was in most cases very slow and often nil; in a few, iodides or x-rays gave a more or less satisfactory result.

We have in recent years had the opportunity of observing a case of chrblm., which seems worth reporting, not only because it is rare and the first of its kind in Canada, but also because it is due to a yeast-like fungus, which is different from any hitherto described species of Fonsecæa-Phialophora.

CASE REPORT

Sil.A., a white man of 54, a cobbler, who had never left this country, entered hospital on October 23, 1940, complaining of verrucose and bad-smelling lesions of the skin.

The family history is devoid of medical interest. The patient relates having had typhoid (?) fever at 7, a cervical (tuberculous?) abscess at 10, right lobar pneumonia at 25 and again at 39. Until the age of 43 he suffered also from asthma. A few months after his last asthmatic attack his scalp showed an insidiously beginning, but progressive alopecia, which soon became confluent, led to total baldness and extended to all parts of the body. At the same time he became nervous and psychically unstable and his virility declined sharply, reaching ultimate impotency.

In 1931 the patient felt an intense pruritus on the web between the fourth and the little finger of the left hand, which was soon followed by a macular lesion. This in turn became verrucose, continued to grow and attained in one year hazel-nut size. In 1934 it had become walnut-sized and formed a cauliflower-like tumour with deep fissures, from which oozed a fœtid, sero-purulent exudate. This lesion was removed by operation elsewhere in a hospital and an (erroneous) histological diagnosis of prickle-cell carcinoma was made on the specimen; the scar tissue received two x-ray treatments and the patient returned home.

One month later, however, the pruritus reappeared in the same spot and was followed by a recurrence of the growth, which soon spread to the entire fourth and to most of the little finger. At about the same time a similar lesion began on the tip of the fourth finger of the other (right) hand and grew in two years to hazel-nut size. The patient entered another hospital in 1936, where he was seen by one of us (Gaumond) and stayed for two months. A biopsy was performed for histological diagnosis, but a small part was used for cultivation. The first showed "blastomycosis approaching the Gilchrist type" (Berger), but the cultures yielded after a few days on Sabouraud's agar and glycerolated potato and carrot dark-brown colonies of yeasts and pseudomycelia, which soon became coal-black on the two latter media. The diagnosis was then corrected to that of "chromoblastomycosis" (Berger). Intensive iodine and x-ray treatments failed entirely; the right fourth phalanx was removed surgically and the left hand lesions were treated by scrapings and electrocoagulation. The patient returned home before being cured. In the following months similar lesions appeared on the dorsum of the left foot, the left forearm, the right buttock, the right ear and the right cheek.

The increasingly foul smell of the lesions, which were otherwise painless, led the patient a third time to still another hospital.

Figs. 1 and 2

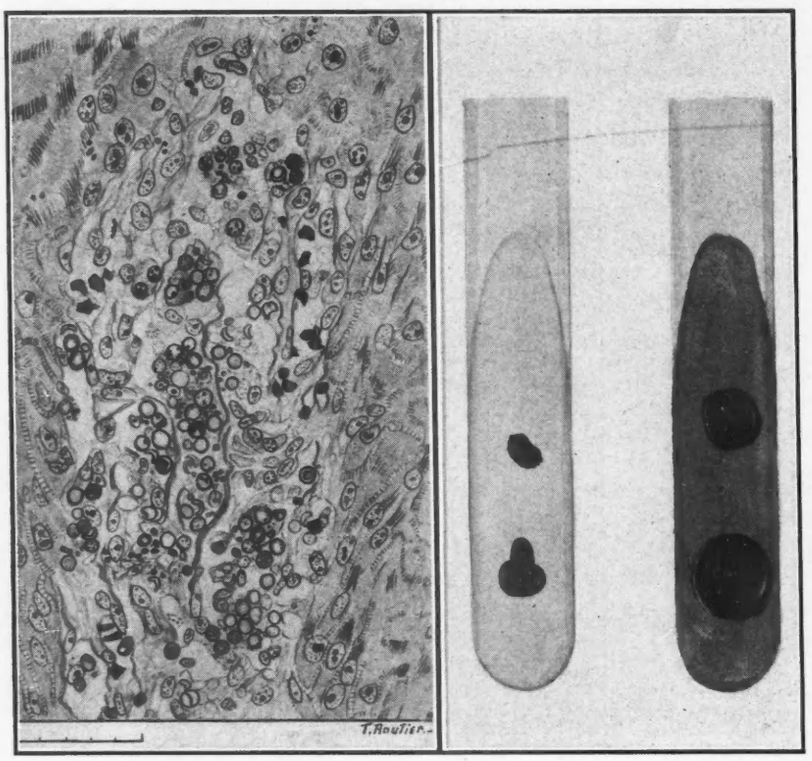
Fig. 1.—Showing 4 of the 7 sites. **Fig. 2.**—Primary lesion of the left hand (which had eventually to be amputated) developing for 12 years.

Physical examination (Beaudry) showed a man looking older than his age (then 54), rather like an old woman, but entirely hairless. The skin was white, smooth and glossy. His testicles were small and hard, but otherwise, the skin lesions excepted, the patient was in a good state of health. The blood count was 4,900,000 red cells and 8,350 white cells, with 48% neutrophiles, 10% eosinophiles, 2% basophiles, 10% monocytes and 30% lymphocytes. All other laboratory examinations of blood and urine gave normal results.

The skin lesions were as follows: the third, fourth and fifth fingers and the greater part of the dorsum of the left hand were covered by thick excrescences of pink, brown or violaceous colour with darker spots, forming a bulky, warty, cauliflower-like mass, with some larger semispherical elements and deep clefts (Fig. 2). At some distance on the left forearm were three similar

lesions of hazel-nut size. The tip of the fourth finger of the right hand, deprived of its phalanx (which was removed in 1936), was drumstick-shaped and covered by another, but darker, brown-black warty mass. The right ear was in great part replaced by a similar brown-black lesion. The dorsum of the left foot showed near the first interdigital space a somewhat lower, dryer and paler tumour. On the right buttock was another similar nodule of hazel-nut size. Two smaller nodules of bean- and cherry-size on the left cheek were the last to appear.

There are, therefore, six different localizations, that on the left hand being the primary lesion. All tumours were more or less moist, of a stale nauseating smell and varied only in size and somewhat in colour, but were obviously of the same nature (Fig. 1).



Figs. 3 and 4

Fig. 3.—Upper part of a dermal papilla, in which the (dark and round) yeast cells outnumber the cells of the inflammatory infiltrate.

Fig. 4.—Aspect of 6 weeks old colonies on Sabouraud's (left) and Loewenstein's (right) media.

During treatment several other biopsies and cultures were made from various tumours, all of which confirmed the diagnosis of chromoblastomycosis.

Therapeutic measures. — Intensive iodine and x-ray treatment were tried again during the first weeks of his stay in the hospital, but remained as ineffective as those of 5 years ago and did not even check the further growth of the lesions. In view of the senile aspect of the patient and his genital insufficiency an endocrine imbalance was thought to be possibly a contributing factor to the pathogenicity of the fungus and large doses of androsterone were administered over a period of several weeks, but gave no result whatsoever. An auto-vaccine was prepared from the fungus, following Méthé's method (Berger), but this vaccination was ineffective, too. Arsenotherapy and methylene blue injections were equally unsuccessful, although the latter seemed at first to stop further growth.

After over two years' trials the lesions were removed by electrocoagulation, scrapings and surgery. The left hand and the fourth right finger were amputated; the cheek lesions were successfully removed by electrocoagulation; the lesions on the ear, forearm and foot were removed by combined scrapings and coagulations, but recurred several times and are not cured at the time of writing. Only one other lesion appeared during the last four years, when the patient was under treatment, and was localized on the right cheek.

Histological Examination

The features are somewhat different in the earlier and later biopsies. In both the epidermis shows an inflammatory hyperplasia with acanthosis and with papillæ growing deep into the cutis; the horny layer is macerated and interspersed with polymorphonuclears. In the first biopsy (1936) the upper layer of the dermis shows a diffuse infiltrate of polymorphonuclears, many of which are eosinophiles, of lympho- and plasmocytes, histiocytes and macrophages, whereas in the later biopsies (1940 to 1944) the infiltrate is more nodular, with some micro-abscesses and foci of histiocytes and of small and irregular giant-cells, a few of which approach the Langhans type; elsewhere in these biopsies the plasmocytes predominate.

The fungus appears as yeast elements, but looks also different in the early and later biopsies; in the first they are very numerous and may outnumber the inflammatory cells, with which they are intermingled; they are rather small and delicate, with fine single membranes; a few are distinctly budding and form short bead-like chains; they accumulate above all in the upper, interpapillary layer of the dermis (Fig. 3). In the later biopsies the yeast-cells are in the middle or deeper layers of the dermis, are scarcer, coarser, thick-walled, irregular, devoid of budding, generally clustered together and often engulfed by giant-cells; many are obviously degenerating.

Mycological Features

The fungus grows equally well at room and incubator temperatures. Colonies on cornmeal and hay infusion agar, Loeffler's serum and blood agar remain small (3 to 4 mm.) and die soon on the two latter media, but are larger on glycerolated potato and carrot and on Sabouraud's agar (4 to 7 mm.), and still larger on Loewenstein's and Petragnani's media (up to 15 mm.). On Sabouraud's agar they are dark-brown from the beginning and half-spherical; on the other media they are coal-black; they are always moist, of creamy consistence and glossy (Fig. 4). At pH 7 they are predominantly formed by yeast cells and show only a scant pseudomycelium; at lower pH's pseudomycelial branching filaments extend on the surface and into the underlying medium and bear clusters of pseudoconidial blastospores; there are no aerial hyphæ. In potato-water (Langeron and Talice) small, fluffy colonies rest on the bottom and the liquid contains a great number of single or budding yeast cells; there is no veil. The fungus does not grow in the depth of agar stabs; it does not liquefy gelatine and has no action on milk. It acidifies the following sugar-litmus-agar media: glucose, fructose, mannose, galactose, cellobiose and xylose, but there is no gas formation in the corresponding liquid sugar media.

Cultures made from a biopsy in 1944 yielded brown to black colonies, which grew much more slowly and were rough and dry and presented microscopical features differing from those of the colonies obtained before.

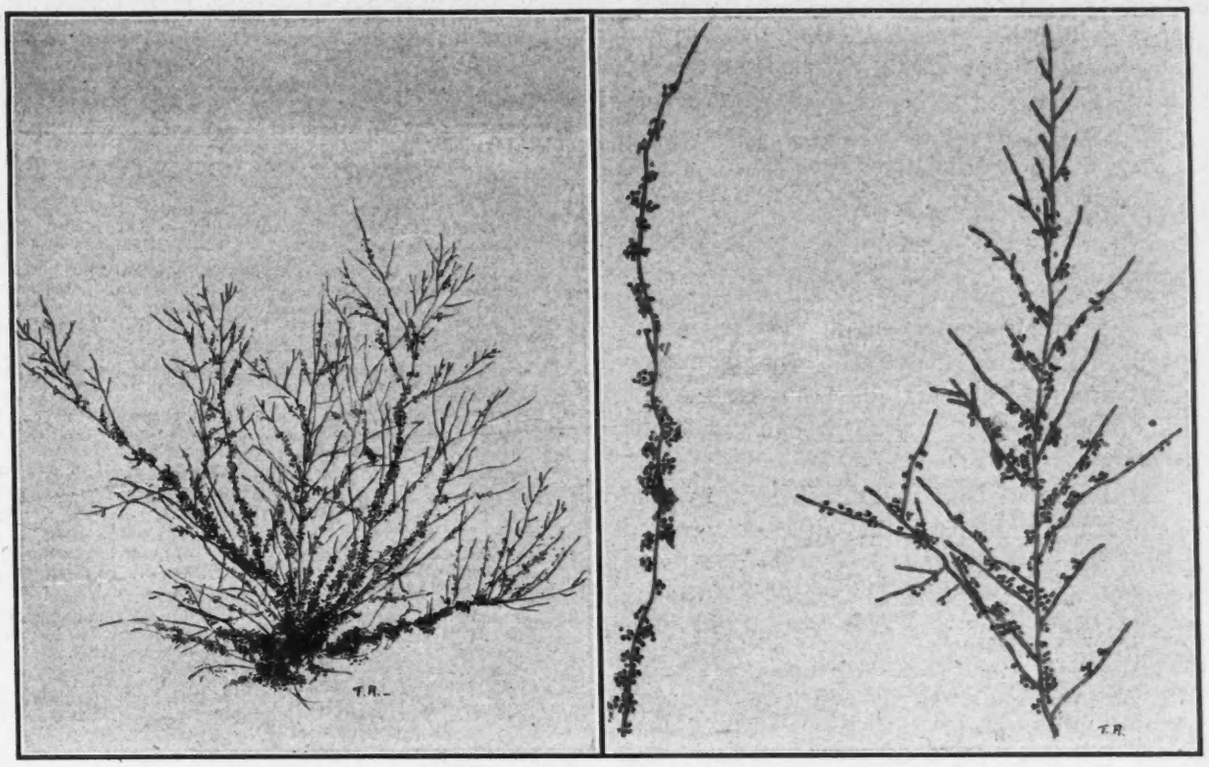


Fig. 5 Fig. 6

Fig. 5.—Low power drawing of a slide culture of 14 days. **Fig. 6.**—Medium power drawing of a slide culture of 18 days, showing the alternate clusters of conidia-like blastospores and the very simple arborization.

The fundamental characters are still yeast-like, but the cells are larger and thicker, often double-walled; the outlines are often irregular and many elements show internal septations in different planes. The resulting multicellular structures become very complicated and are made up of intricately intertwined, irregularly curved and anastomosing, rather thick threads of clustered elements, which grow in all directions. The individual cells may contain one or more round lipoid inclusions and closely recall the "durable cells" (Dauerzellen) of Will; they may be considered also to be sclerotic cells and are obviously a variant of the initially yeast-like pseudomycelial fungus.

In hanging drop and slide cultures many budding cells may be seen, which remain attached to the mother-cell and form by successive buddings moniliform strands of various length; the latter become pseudomycelial through elongation of the individual elements. Apical blastospores appear and give in turn rise to pseudomycelial threads, but the branches are few and the resulting arborization is, therefore, rather simple. Some blastospores show intensive budding of many smaller, conidia-like blastospores, which form soon more or less large clusters of easily detached cells. There is no trace whatsoever of conidiophores or of any other specialized apparatus of sporulation, although many colonies were kept alive for over two years (Figs. 5 and 6).

The behaviour of the colonies on the various media and the morphological and physiological characters of the strain are very different from those of Fonsecæa-Phialophora (including Hormodendrum and Phialophora verrucosa). The prevalent yeast-form of the fungus, the budding of the cells, which give first moniliform strands and later a poorly branched pseudomycelium, the clusters of small blastospores and the lack of any specialized sporulation method are all characters featuring genus Candida Berkhout 1924 (Langeron and Guerra, emend.) — the colour of the colonies excepted. The temptation was, therefore, great to consider the present fungus as an undescribed black strain of that genus and to call it: Candida nigra Canadensis, the more so as Burri and Staub[7] in 1909 and Browne[8] in 1918 had described non-pathogenic strains of Monilia nigra, which may eventually prove to be synonymous with Candida Berkhout. Langeron and Guerra,[9] who proceeded to a revision of genus Candida (Monilia) state, however, most emphatically, that "all coloured yeast-like fungi belong to genus Toruleæ sensu Persoon". And, indeed, Dr. Emmons and Dr. Carriòn, to whom we had sent cultures of our strain, believe that it may be related with Pullularia pullulans, which belongs to genus Toruleæ (personal communications). Many characters of the strain are, however, different from those of Pullularia pullulans as reported by Dodge[10] and the species itself is far from being definitely established. One is here confronted, once more, with the difficulty of determining lower fungi, which has led to the present

over-complicated and almost inextricable nomenclature. In order to avoid further complications and an eventual revision we shall, therefore, content ourselves for the time being with considering the present strain as a brown-black Candida-like, but still innominate species.

SUMMARY

The first Canadian case of chromoblastomycosis, the 11th on the North American continent, is reported. It is featured by papillomatous lesions of over 14 years' duration on the left hand, from where it spread, probably by autoinoculation, to the other hand, one forearm, foot, ear, buttock and both cheeks. The individual tumours are similar to the hitherto reported cases of the papillomatous type. Their response to iodine, methylene blue and x-ray treatments and to vaccination was very deceptive; only scrapings and electrocoagulation gave some results, but were followed by many recurrences; one finger and the left hand had to be amputated. At the time of writing the patient is far from cured.

Histologically the lesions resembled those of the classical type, but showed a less nodular infiltrate in the earlier biopsies, and yeast-bodies, which were smaller, more delicate and distinctly budding.

Isolates, obtained several times over a period of 7 years, yielded always deep-brown to coal-black colonies; the latter grew well and were of creamy consistence and glossy from all biopsies, except the last in 1943, when they were rough, dry and slow growing. The features are different from those of genus Fonsecæa (Carriòn) or Phialophora (Emmons), which was the pathogenic genus in all cases reported before.

The prevalent yeast-like appearance of the strain, the very simple features of its pseudomycelium and the absence of any specialized sporulation method are characters featuring Candida Berkhout; but no black species being known in the revised genus, and in view of the actual confusion in classification and taxonomy of yeast-like fungi we shall refrain from any definite identification and be content with considering the strain provisionally as a black Candida-like, but still unnamed new species.*

* A more detailed report upon the histological and mycological features of this case will be published elsewhere.

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RÉSUMÉ

Le premier cas canadien de chromoblastomycose, le onzième sur le continent nord-américain, est décrit. Il est caractérisé par des lésions végétantes papillomateuses, en partie très étendues, des deux mains, des deux joues, de l'avant-bras, du pied, de l'oreille et de la fesse, qui évoluent depuis 14 ans. La lésion primitive siégeait au niveau de la main gauche et semble avoir été propagée par autoinoculation aux autres endroits. Les tumeurs individuelles ont les caractères macro- et microscopiques du type papillomateux décrits dans les cas antérieurs de chrblm. ou de blastomycose de Gilchrist, mais l'infiltration inflammatoire était beaucoup moins nodulaire dans les premières biopsies. Le traitement par les iodures, le bleu de méthylène et les rayons X et au moyen d'un autovaccin ne donna aucun résultat durable; une partie des lésions furent guéries ou améliorées par des grattages et l'électrocoagulation, mais récidivèrent à plusieurs reprises. Une main et un doigt durent finalement être amputés. Une guérison définitive n'a pas été obtenue.

L'agent pathogène est représenté par des levures qui sont mêlées, souvent en grand nombre, aux cellules inflammatoires. Elles sont de petite taille et ont une simple membrane très mince. Quelquesunes sont nettement bourgeonnantes et forment parfois de courtes chaînettes moniliformes. En profondeur des tissus il y a des levures sous forme de sclérotes.

Plusieurs ensemencements, faits sur une période de 7 ans, donnèrent toujours des colonies brun-foncé ou noires; elles furent de consistance crémeuse et luisantes dans tous les prélèvements faits de 1936 à 1943, mais dans le dernier, fait en décembre 1943, elles furent rugueuses et sèches.

Les caractères mycologiques de cette souche sont tout à fait différentes de ceux de Fonsecaea (Carriòn) ou Phialophora (Emmons), comprenant Hormodendrum Pedrosoi et Phialophora verrucosa, qui était jusqu'à présent le seul genre que l'on ait mis en évidence dans des cas de chrblm.

La prédominance des formes levures, la simplicité du pseudomycélium et l'absence de tout appareil spécialisé de sporulation rapprochent la souche du genre Candida Berkhout, mais la confusion actuelle dans la classification et la nomenclature des champignons levuriformes nous incite à renoncer provisoirement à une désignation définitive de notre souche et à nous contenter de la considérer comme une éspèce brun-noir nouvelle, ressemblant au genre Candida, sauf en ce qui concerne sa couleur.

INTERNAL DERANGEMENTS OF THE KNEE IN MILITARY PRACTICE

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Canadian Orthopædic Unit in Great Britain

AN internal derangement of the knee is a common condition for which a soldier may seek medical advice, and is second only in frequency to orthopædic conditions occurring about the foot and ankle. The former is often due to injuries in civil life, made manifest by the rigours of initial army training. Since the stationing of this Unit in an area in Great Britain where primary training camps are located, approximately 9,000 soldiers have been referred for orthopædic opinion, and, of these, 1,350 had symptoms referable to the knee joint. It is the purpose of this paper to present a review of 400 cases in which meniscectomy was performed by various surgeons of the Canadian Orthopædic Unit.

There are certain well established facts about lesions of the menisci:

1. An internal meniscus lesion is more common than an external one, due to the fact that the medial cartilage is more firmly anchored to the tibia than the external, and also that it is situated at the apex of an obtuse angle between the tibia and the femur. Conditions which result in an increased tibio-femoral angle, such as genu valgus, pes planus and a female type of pelvis, increase the liability to fracture or displacement of the internal meniscus.

2. The peripheral part of the cartilage is vascular and the inner two-thirds or free border is non-vascular; therefore tears in the former may heal while those in the latter zone will not unite of their own accord, no matter how long immobilized. McMurray, in a series of 600 cartilage injuries seen after the first episode suggesting a tear, immobilized the knee in plaster of Paris for four to six weeks, and two to five years later 50% had had no recurrence of symptoms. Cravener and Macelroy state that 45% of fractures of the cartilage are in the avascular zone and 55% in the vascular area.

3. Cravener and Macelroy in a series of 1,700 cases have shown that the best time to operate upon knees suffering from recurrent internal derangement of the meniscus is 25 to 26 weeks after the first injury. There is less reaction to surgery, and less fluid in the knee joint post-operatively. Cases with longstanding trouble in the joint do not do well following surgery, as the knee which has been subjected to repeated internal trauma is likely to be the seat of arthritic change.

4. Duthie and McLeod, analyzing knee cases from which cartilages have been removed have shown that the average total time off duty is increased in those in which the preoperative duration of symptoms exceeds two years; and that this was even greater in those instances where symptoms have been present for five years before operation.

5. At the beginning of this war meniscectomy in soldiers was looked upon with some disfavour, but MacKenzie and MacFarlane; Cleveland, William and Doran, have shown that the reverse is true. With a concentrated course of rehabilitation following meniscectomy the operation in soldiers has been shown to be a good one, provided the proper type of individual is selected for surgery.

Because the knee is injured, it does not necessarily follow that the semilunar cartilage is fractured or displaced. Rotation sprains or twists with the knee flexed and weight transmitted through the joint is usually the injury which results in a damaged cartilage. Recurrent attacks of internal derangement may occur after trivial injuries and in some cases the loose or torn cartilage may be displaced even on a route march. In over 80% of our cases such was the mechanism of injury, and it usually occurred during some athletic endeavour, such as football, ski-ing, etc. Over 25% stated they had symptoms of a cartilage lesion before entering the services.

A general examination of the patient is necessary to rule out any systemic condition such as rheumatoid arthritis, tabes dorsalis, etc., which might have a bearing on the knee

joint. No knee has been properly examined until lesions of the central nervous system, hip, ankle and foot have been considered. The range of movement of the knee, the stability of the joint, the state of all the ligaments and the size and tone of the quadriceps should be compared with the other and presumably normal knee. Extra-articular lesions such as enlarged bursæ, cysts, and slipping tendons should be considered and any tenderness about the joint and joint line accurately noted. In the case of a torn cartilage the tenderness may be localized to one of three points—the anterior and posterior horns, and in the case of the medial cartilage, the middle of the internal ligament of the knee. The locality of the tenderness in respect to the joint line may be a lead as to the site of the tear. X-rays in two or more planes are required for adequate examination. In the case of a torn cartilage a negative x-ray is to be expected. Widening of the lateral part of the joint line is suggestive of a cyst of the lateral cartilage.

Locking of the knee is due to the interposition of tissue between the articular cartilage of the tibia and femur, and may occur also in cases of hypertrophied fat pad, sequestrated portions of the articular cartilage or loose fragments arising from synovial tags. It occurs only in anterior horn tears, or longitudinal splits of the so-called "bucket handle" type. Tears of the posterior half of the cartilage are more difficult to diagnose. Locking is not a symptom, but the patient often complains of insecurity of the knee and a feeling that the joint might give way when going down stairs or downhill. McMurray's test for posterior horn lesion has proved of considerable value in making a diagnosis in this part of the cartilage. Twelve per cent of the cases were lesions of the posterior horn.

Tears of the external meniscus may be more difficult to diagnose. The pain is not so well localized, and the patient may complain of discomfort in the centre or at the back of the knee. The tenderness however is localized to some part of the external cartilage and often there is a "clunk" toward the end of active extension of the knee. Tears of the internal meniscus are 4.9 times as common as those of the external.

Any part of the semilunar cartilage may be torn, the tears being longitudinal, transverse, oblique, marginal or pedunculated. The longitudinal split may occur in the non-vascular zone, and the central fragment be displaced into the intercondylar notch, producing a "bucket handle" type, or occur in the peripheral part of the cartilage so that the whole or almost the whole of the meniscus is displaced. More than one fracture may occur in the same meniscus, but appears usually in those in which the cartilage has been displaced many times. The tears may be a double "bucket handle" or more commonly a longitudinal and transverse one combined. Fraying of the anterior horn or free margin is not uncommon, particularly in those cases where the articular cartilage is showing degenerative changes such as osteochondritis.

DIFFERENTIAL DIAGNOSIS

1. *Loose bodies.*—Loose bodies can occur in either healthy or diseased joints, and when they are situated in the anterior half of the knee may produce locking. This is usually only momentary and associated with pain which varies with the situation. The x-ray in the case of the cartilaginous type may show a defect on the articular surface of the femur from which the loose body has arisen. Foreign bodies may be part of a torn cartilage or arise from synovial tags.

2. *Pathological conditions of the infra-patellar fat pad.*—This structure may be enlarged or fibrosed, and as such becomes pinched between the tibia and femur when the knee is extended. The symptoms are similar to a cartilage lesion, but the pain is usually across the front of the joint. Occasionally there is tenderness on one or both sides of the patellar tendon.

3. *Arthritis.*—In this state there is a history of gradual onset of aching pain, worse in cold or damp weather. There is crepitation on movement and an x-ray shows spurring and bony irregularity, usually first evident on the poles of the patella and articular surface of the tibia. Minor degrees of arthritis in a knee should not be a contra-indication to the removal of a torn cartilage in an individual under 30 to 35 years of age, if the meniscus is interfering with free movement of the joint. Arthritis however, does carry with it a guarded prognosis and a somewhat prolonged convalescence if meniscectomy is performed.

4. *Strained or torn internal collateral ligament.*—In these instances there is tenderness over the whole course of the ligament, as opposed to pain directly opposite the joint line in the case of a torn cartilage. Abduction of the knee increases symptoms. There may be limitation of extension in the very acute phase of the strain due to reflex spasm of the hamstring muscles. The knee, however, gradually straightens over days and may be completely extended as soon as the patient is surgically anæsthetized. Following a rotation-abduction strain of the knee a fractured cartilage may be present as well as an injured internal ligament.

5. *Injury of the cruciate ligaments.*—If the cruciate ligaments are ruptured there is increased antero-posterior movement as compared with the normal knee. In the case of a torn anterior cruciate the tibia can be pulled forward on the femur and in those rare instances of complete tears of the posterior cruciate, the tibia can be subluxated backwards on the femur. The ligaments of the knee are so strong that occasionally in place of rupturing a piece of bone is pulled off with the ligament.

6. *Pelligrini-Stieda's disease.*—This condition resembles a strained internal collateral ligament, but on x-ray examination there is calcification at the femoral attachment of the ligament.

7. *Fracture of the anterior spine of the tibia.*—The fracture resembles to some extent an anterior cruciate tear. There is usually inability to extend the knee fully. The diagnosis is confirmed by x-ray.

8. *Exostosis and slipping tendons.*—Although these are extra-articular lesions, to the uninitiated they may simulate an internal derangement of the knee. The semi-tendinosus or sartorius tendon may cause pain or even locking of a momentary nature as they slip over bony spurs and osteophytes of the tibia.

TREATMENT

One should approach cautiously a knee in which an initial tear of the cartilage is suspected. The diagnosis of a primary injury is difficult, and there may be doubt whether the lesion is a severe rotation sprain of the coronary ligament or a torn cartilage. A course of exercises in the gymnasium or a cross-country run may be the deciding factor. If the knee stands up to this strain well and good, if not, it is wise to immobilize the leg in plaster of Paris for 3 to 4 weeks. Meniscectomy in cases of an initial tear of the meniscus should be reserved for those where the knee is locked and resists reduction, or where the process of unlocking is accompanied by a definite audible "clunk". The history only of a torn cartilage is not sufficient to warrant exploration of the joint. It is easy for a soldier to learn the story and present himself as a candidate for surgery and a period of rest in hospital. Some definite physical findings should be present in every case before the knee is opened.

The treatment of a torn meniscus with a recurrent displacement is meniscectomy and operation should not be too long delayed.

As previously mentioned, the optimum time for meniscectomy is approximately 25 to 26 weeks following initial injury. If a torn cartilage is left too long, in which time there are many episodes of recurrent locking and effusion, this additional internal trauma to the knee initiates arthritic changes and the result of surgery after arthritis has commenced are less spectacular. A mild degree of arthritis, however, in a young man in the services should not be a contra-indication to surgery, as the arthritic process may subside after the causative factor has been removed. In the presence of a second intra-articular lesion such as a torn anterior cruciate ligament or osteochondritis dissecans a more conservative outlook in the serving man should be displayed.

Operation in our cases is performed after a 48-hour sterile skin preparation. With a tourniquet applied over a towel about the thigh, a small antero-medial incision is made of either the Jones or Fisher type. The latter is preferred for opening the medial side of the joint, as it is roughly parallel with the infra-patellar branch of the saphenous nerve. This incision gives adequate exposure and in none of the cases where a Fisher incision was used did the patient complain of anæsthesia below the patella, nor did a painful neuroma occur in the wound. After the anterior horn and front half of the cartilage is freed from its attachment a Smillie cartilage knife is used to remove the posterior half of the crescent. When necessary, a second incision over the posterior horn is made to remove the back of the cartilage. Two incisions heal just as rapidly as one and

do not influence convalescence. Before the tourniquet is removed a well padded pressure bandage is applied.

There is some difference of opinion among surgeons as to how much of a torn cartilage to remove. The problem is, should we remove the whole or just the torn portion? No doubt the removal of only the torn part of the meniscus, when it is of the "bucket handle" variety, will give a good result, and the symptoms for which the patient sought medical advice disappear. This is probably all that is necessary in civil life and in those not participating in athletic endeavours; however it is not uncommon to find more than one tear in the same meniscus and in all probability the two tears did not occur at the same time. Second, in cases where only the torn portion has been removed it sometimes occurs that after another strain of the knee the man returns with a tear in the remaining portion of the cartilage. In our series we have had 10 cases where the knee was opened for a second time and the remaining piece of torn meniscus or "regenerated cartilage" removed. This is particularly true where a large portion of the rim or posterior horn has been left. Upon similar observations many orthopædic surgeons doing military work have recommended removal of not only the torn portion, but the whole of the semi-lunar cartilage in every case. I believe that where the tear is a large one of the "bucket handle" variety, and involving at least two-thirds of the width of the cartilage, the torn portion only should be removed. Where the tear is small, and leaving a relatively large portion of the cartilage still attached, the whole meniscus including the posterior horn should be excised. In over 300 instances a total meniscectomy was performed.

CONVALESCENT CARE

The aim of treatment is to obtain a painless stable knee with intact ligaments, a full range of movement and a strong fully developed quadriceps muscle. All writers are agreed that active exercise is the method to obtain such a goal. The most important muscle so far as the knee joint is concerned is the quadriceps expansion and no knee is considered normal without full support of this structure. In our cases quadriceps-setting drill is commenced at least 48 hours prior to meniscectomy and resumed 48 hours after operation. Preoperative instruction in quadriceps exercises teaches the patient how to perform the act and is easily re-established following operation. Duthie and McLeod have shown that there is a slight decrease in the total time off duty in cases where preoperative exercise is given. By the third day the soldier can raise his leg off the bed. Exercises are given twice daily for 15 minutes, supervised by an Army Physical Training Corps instructor, and every hour for five minutes by the nursing sister in charge of the ward. On the 10th day the patient is allowed out of bed for half an hour and thereafter for longer periods according to his tolerance. During the third and fourth weeks in hospital the soldier attends the gymnasium for more strenuous exercises including quadriceps drill against resistance. Cases with minor degree of fluid within the joint have the knee strapped with elasto-crepe bandage.

Severe postoperative effusion is very uncommon and where necessary this is aspirated to relieve tension and prevent attenuation of the cruciate ligaments. It appears that concomitant ligamentous injuries frequently occur when a cartilage is torn, and may give rise to persistent instability and effusion in the joint, thus explaining failure in certain cases. In 250 instances the knee was immobilized in extension for 21 days by a posterior metal splint, the remaining 150 were not splinted, but allowed to move their knee within the compression bandage. There was no difference in either the immediate or late results in these two series.

RESULTS

No deaths or cases with intra-articular infection occurred. Six developed either a hæmatoma or a stitch abscess in the wound, but healed up without adverse results. In the removal of the medial cartilage using the Jones incision, 12 cases complained of anæsthesia over the front of the knee, due to bisection of the infra-patellar branch of the saphenous nerve; two later required operation for removal of a painful neuroma. By the use of the Fisher incision this complication was avoided. The Table shows the site of tear and various lesions associated with a torn cartilage.

The average period spent in hospital was 48 days, the shortest 26, and the longest 128 days. The latter showed persistent effusion in his

TABLE I.
LESIONS OF THE MENISCI

	Arthrotomy and meniscectomy	*Arthrotomy no meniscectomy*
Longitudinal splints and "bucket handle" tears	164	
Tears of the anterior horn	44	
Tears of the posterior horn	45	
Multiple tears in one cartilage	10	
Totally displaced and hypermobile	22	
Discoid cartilage alone	6	
Discoid cartilage plus tear	4	
Meniscectomy for removal of a remaining torn rim and regrowth of cartilage	6	
Removal of remaining posterior horn	4	
Normal cartilages	39	
Cysts of the cartilage—medial	2	
Cysts of the cartilage—lateral	17	
Cysts of the lateral cartilage plus tear	5	
Fat pad hypertrophied plus torn cartilage	11	
Fat pad hypertrophied—alone—no tear		11
Osteochondritis associated with a torn or frayed cartilage	21	
Osteochondritis alone		9
Synovial tags and fringes		5
Cases with "two cartilages" removed from the same knee	(30)	
	400	25

knee due to an old tear of the cruciate ligament which was not diagnosed before operation. On the whole, cases with laxity of the anterior cruciate ligament were subject to recurrent effusion in the joint during the 3rd to the 5th weeks postoperative. Convalescence in hospital was prolonged about 50% and it was necessary to restrict their activities, bandage their knees and gradually build up their tolerance to exercise. All patients were transferred to an Army Rehabilitation Depot at the end of their stay in hospital. Analysis of 186 cases recorded by Duthie and McLeod, following meniscectomies and treated at a Rehabilitation Depot has shown the following:

IMMEDIATE RESULTS AFTER REHABILITATION IN ARMY CONVALESCENT DEPOT

Men A.1. on admission to depot	75.0%
Men below A.1. on admission to depot	25.0%
Men A.1. on admission and discharged A.1.	91.2%
Men A.1. on admission and downgraded	8.8%
Men below A.1. on admission, but upgraded to A.1.	3.0%
Men below A.1. on admission, further downgraded	1.0%
Men below A.1. on admission, discharged unchanged	19.0%
Men re-admitted to hospital for re-operation or manipulation	3.9%

RESULTS OF MENISCECTOMY 6 MONTHS TO 1 YEAR AFTER DISCHARGE FROM ARMY CONVALESCENT DEPOT AND RETURNED TO DUTY

Men A.1. downgraded after discharge	27%
Men A.1. still A.1.	73%
Men below A.1. further downgraded	39%
Men below A.1. with category unchanged	61%

SUMMARY

1. An internal derangement of the knee is a common disability in soldiers.

2. A brief analysis of 400 cases in which meniscectomy was performed, is given herewith.

3. The diagnosis of a meniscus lesion is at times difficult and carries an overall diagnostic error of 10%.

4. The concommitant lesions of the knee such as osteochondritis, loose or torn ligaments, prolonged the convalescence and carry a guarded prognosis. Operation in these instances is contra-indicated except in selected cases.

5. The value of pre- and postoperative rehabilitation is stressed.

6. Postoperative immobilization of the knee does not appear to influence either the immediate or late results.

7. Seventy-three per cent of men were A.1. six months to one year after this operation.

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There is no practical procedure which affects the fibrillating heart muscle, and an intracardiac injection of epinephrine can be relied on to do but one thing, namely make fibrillation worse, so that any chance of spontaneous shift to normal pulsation is lost.—*J. Am. M. Ass.*, **128**: 656, 1945.

SEVERE ANÆMIAS OF PREGNANCY AND THE POSTPARTUM STATE*

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and
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IN 1919 the late Sir William Osler published his "Observation on the severe anæmias of pregnancy and the postpartum states". He divided such cases into the four following groups: (1) Anæmia from postpartum hæmorrhage: (*a*) profuse and rapidly fatal hæmorrhage; (*b*) anæmia following repeated small hæmorrhages. (2) The severe anæmia of pregnancy: chloro-anæmia of pregnancy, which might pass on to a grave and fatal form. (3) The acute anæmia of postpartum sepsis. (4) Postpartum anæmia: a common form in which, following uneventful delivery without undue loss of blood, the patient becomes increasingly pale with a rapid fall in blood values. While clinically identical with Addison's anæmia, a large percentage of such postpartum cases recover spontaneously without any tendency to recurrence of the condition.

Sir William stressed the continuous septic-like fever which was often present and warned against being misled by it, citing a case which had been erroneously diagnosed as malaria fever. Cabot observed that not uncommonly such cases were diagnosed as typhoid fever.

Osler at that time made no division into temporary pernicious anæmia and Lederer's hæmolytic anæmia, but pointed out the variations seen in the blood studies of these cases, some with reticulation as high as 20 and 25% and marked evidence of hæmolysis, and others with leukopenia, thrombocytopenia and aplasia. Many cases showed the characteristic Addisonian picture, without, however, neurological changes.

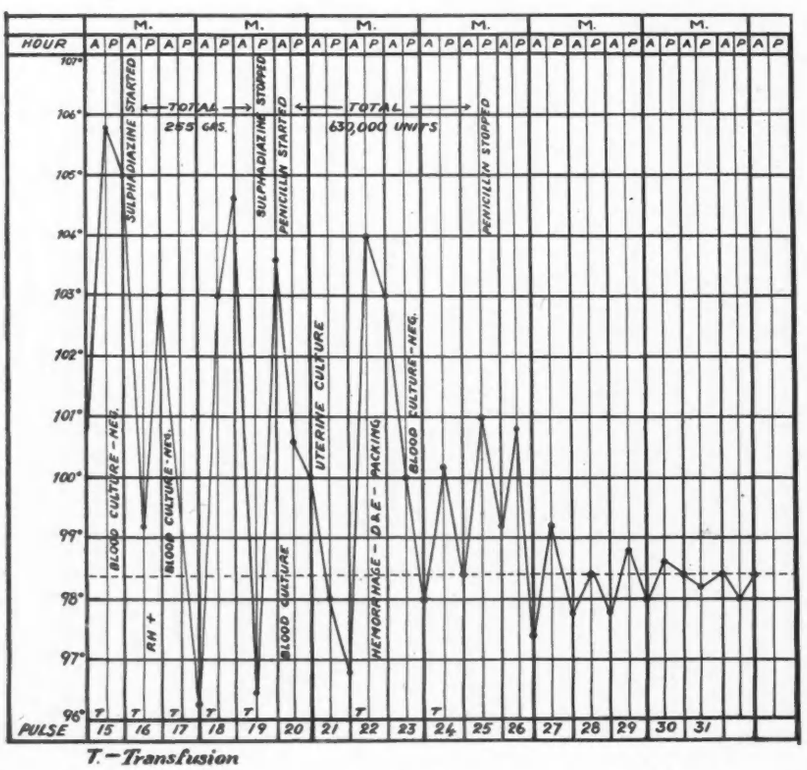
Such a case was recently admitted to the gynæcological service of the Montreal General Hospital.

The patient was a 22-year old French Canadian para ii. Her first pregnancy was normal throughout and terminated with the spontaneous delivery of a healthy male infant. There was no anæmia before or following the labour. A second pregnancy occurred one year later. No prenatal care was received and the patient stated that she remained in good health until the last month of her pregnancy, when she became aware of easy fatigue, dyspnœa on exertion, and pallor. Delivery took place in her home, was easy, spontaneous and without gross hæmorrhage. The child, a male, was healthy and weighed seven pounds at birth.

Within the first 24 hours following delivery, it was observed by the patient's relatives that she was extremely weak and pale and appeared to be definitely febrile. These symptoms became progressively more alarming until on the eleventh day postpartum she was admitted by ambulance to the gynæcological ward of the Montreal General Hospital.

On admission, the patient was extremely pale and had a temperature of 103°. Dyspnœa was present on the slightest exertion, but not noticeably so when lying flat in bed. There were no petechiæ or ecchymosis, and the tongue was not smooth and apparently normal. The spleen was palpable at the costal margin. Pulse was 120, regular and good volume. Blood pressure was 110/60. There was no evidence of cardiac failure. On pelvic examination, the vagina was clean, lochia scant, normal in appearance, without odour. The cervix was lacerated, but clean. The uterus was well involuted and deep for eleven days postpartum, and mobile. No tenderness was elicited on deep palpation over the broad ligaments. The appendages were normal. The patient's temperature from time of admission was definitely septic in character. (See Chart 1).

The hæmoglobin was 18%, with a red blood count of 730,000, and white blood count of 4,800. A ten-



T.—Transfusion

Chart 1.

* From the Gynæcological Service of the Montreal General Hospital.

tative diagnosis of puerperal sepsis with anæmia was made, and while awaiting the results of a blood culture, multiple blood transfusions were given. Satisfactory increase in hæmoglobin and erythrocytes occurred, but a progressive leukopenia and thrombocytopenia continued. (See Chart 2). There was a macrocytosis and marked variation in the red cells.

By the fifth hospital day, the platelet count had fallen to 35,000 and there were only 1,200 leucocytes per c.mm. The reticulocytes remained below 1%. Spontaneous uterine hæmorrhage occurred at this time, necessitating packing. The usual therapy, including sulfadiazine and penicillin, failed to cause any improvement in the septic picture. Repeated blood cultures showed no organisms, and it became obvious that the case was an acute postpartum anæmia, closely resembling that described by Sir William Osler.

Repeated transfusions, totalling 6,000 c.c. augmented by general supportive measures was followed by an uneventful recovery. Since discharge on the 29th day, the patient has remained in good health, without any suggestion of anæmia, and a normal blood picture has been maintained for eight months without further treatment.

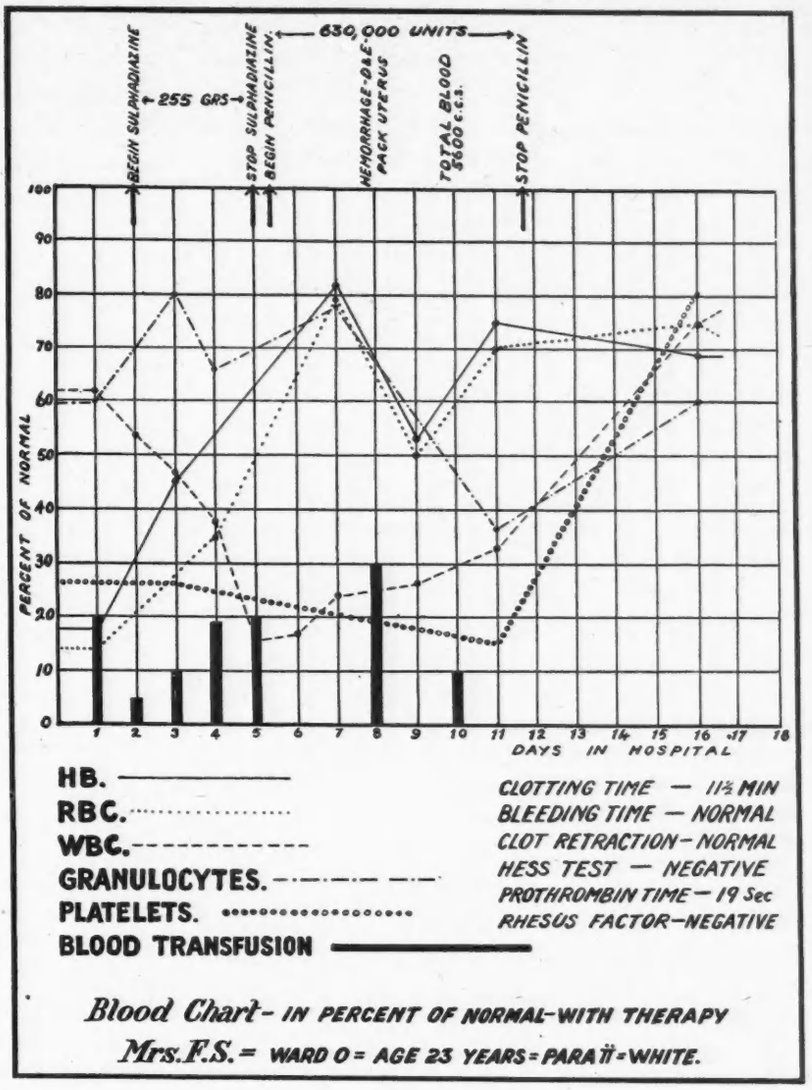


Chart 2.

COMMENT

The temporary pernicious anæmia of pregnancy and the puerperium is clinically identical with Addison's anæmia. It occurs most frequently in multipara, in the middle or later years of reproductive life. The early signs are often insidious, appearing during the last trimester, but may develop, as in our case, suddenly or even dramatically, soon after delivery. There is a macrocytosis, with a positive colour index. Reticulocytes remain less than 1%, thrombocytopenia is common. Improvement is rapid and sustained with liver therapy. On the other hand, in the acute hæmolytic anæmia, the reticulocytes invariably become elevated without treatment while improvement seldom follows liver therapy.

From time to time one encounters cases which present certain features because of which classification is difficult. In Lescher's series of 17 cases of grave anæmia, associated with pregnancy, nine were diagnosed temporary pernicious anæmia, and eight hæmolytic anæmia. All but three of the latter, however, showed macrocytosis, some had low or absent gastric HCl., and in one, excellent improvement followed liver therapy alone. It is very difficult to prove clinical hæmolysis by hæmoglobinæmia or abnormal blood cell fragility, as these are seldom increased. Evidence of moderate hæmolysis occurs in pernicious anæmia, as evidenced by an increased icterus index, indirect Van den Bergh reaction, and changes in skin colour. The reticulocytosis, normal platelet count, and failure of liver therapy are the outstanding diagnostic aids in Lederer's anæmia, while thrombocytopenia, normal reticulocyte count, and the spectacular response to liver therapy, constitute the diagnostic features of temporary pernicious anæmia.

The constant thrombocytopenia mentioned above, may occur before a diminution of hæmoglobin, or red cells.

Another case, para iii, routinely examined at 3½ months, showed an abnormal platelet count of 83,000. The hæmoglobin was 80%, red cells 4,120,000, white cells 7,650. Over a short period,

platelets fell to 43,000 and were not improved by iron or fresh blood transfusions. In the hope of arresting this rapid deterioration, the patient was admitted to the gynæcological service of the Montreal General Hospital and the uterus evacuated by abdominal hysterotomy. Within the next two weeks, the platelets rapidly increased to a level of 179,000 on discharge. This woman had severe hæmorrhages with each of her previous confinements. With her first baby the bleeding occurred eight days postpartum, for no apparent reason.

We have seen two cases, more recently, in whom spontaneous abortion occurred, with similar thrombocytopenia, which rapidly returned to normal following termination of pregnancy.

In view of the foregoing, further investigation on the significance of blood platelet counts in the anæmias associated with pregnancy, is being carried out. It may well be that an early fall in platelets may be the forerunner of a progressive anæmia, for which iron is of little or no value. The judicious use of liver extract instituted as a prophylactic measure may forestall the grave anæmia described by Osler.

The etiology of these anæmias is unknown. The fact that in the majority of reported cases there has been inadequate prenatal supervision, suggests an extrinsic factor, and emphasizes the need for proper diet, fortified, if necessary, by food supplements. Repeated blood examinations during this period are essential.

Osler suggested that some hæmolytic agent or toxin was responsible, but was unable to determine its nature and as yet no further progress has been made. Reynolds in the "Clinical Significance of the Rh Factor", suggested that incompatibilities between maternal and fetal bloods resulted in hæmolysis of the maternal blood, and profound anæmia. This was brought about, he felt, when an Rh + mother, gave birth to an Rh – baby, and antibodies formed in the fetus entered the maternal circulation.

In case 1, the mother was Rh –, and both her babies Rh +, with no evidence of erythroblastosis fetalis. No antibodies have been demonstrated in either mother or her babies.

Rh incompatibility may be responsible for the hæmolysis of Lederer's anæmia, but, as yet, we have been unable to prove this thesis. It would appear in the light of existing evidence, that the maternal anæmia is probably not produced by antibodies formed in her fetus.

SUMMARY

1. A case of acute postpartum anæmia, with thrombocytopenia and leukopenia is presented.

2. Grave anæmias of pregnancy and the postpartum are discussed.

3. Thrombocytopenia may be a forerunner of the severe anæmias of pregnancy and the postpartum states, described by Osler. Platelet counts therefore should be a routine in prenatal blood studies.

We are indebted to Dr. L. K. Diamond of Boston for verifying Rh factors and for his constructive suggestions.

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PROCEDURE IN THE TREATMENT OF HEART DISEASE*

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THE object in this presentation is to reduce the problem of the treatment of heart disease to a handy package for practical use. We carry to the bedside only compacts of information. Refinements in knowledge of the subject are applied at greater leisure. The modern treatment of heart disease is a rational therapy. Procedures follow systematic lines.

In every instance of probable heart disease when called to see a patient for the first time in an emergency or to review a patient previously examined, automatically four broad considerations cross the mind: (1) Is heart disease the cause? (2) Is there potential heart disease? (3) Is it acute heart failure? (4) Is it chronic heart failure?

The four questions should appear to every examiner whenever confronted with the probability.

IS HEART DISEASE THE CAUSE?

This question arises in every instance of a rapid pulse, a weak pulse, an irregular pulse, air hunger, pallor, cyanosis, syncope, collapse,

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precordial pain, high and low arterial pressure. Each one of these indications is present in heart disease, none of these is a pathognomonic sign.

To illustrate: a young mother suffering from mitral stenosis decided to risk the hazards of pregnancy. Both pregnancy period and confinement proceeded uneventfully. When she returned to her room after delivery the patient was in an alarming condition, she was blanched, the pulse was collapsed, her blood pressure had fallen. The attending obstetrician was sure hæmorrhage did not account for this state. In view of the background the first thought was of an acute cardiac complication. In spite of the nature of her basic ailment the emergency resembled shock. Instead of heart stimulants she received an immediate saline infusion followed by a blood transfusion resulting in complete restoration.

The person with a bad heart can have gall bladder colic, a ruptured gastric ulcer, peripheral vascular shock and all other types of emergencies.

Primary acute heart disease is not always immediately differentiated from other causes which resemble a failing heart. Pulmonary embolism producing the clinical picture of acute cor pulmonale is not primarily heart failure. Circulatory failure from shock and internal hæmorrhage and syncopies of cerebral origin are at times misleading.

When heart disease is not obviously present, the following working rule should be kept in mind: One rarely develops heart disease out of a clear sky! There must be some reasonable clue to the origin of the pathological development such as: a past or present toxic infectious focus; signs reflecting degenerative or deficiency processes; a congenital basis; physical chest abnormalities or trauma.

In the absence of major presaging events, spontaneous heart disease is unlikely. For instance, a rapidly failing pulse and alarming falling blood pressure in one patient following an abdominal operation made it appear, judging by the nature of the operative findings, that a complication involving the heart had set in. There were no signs of occult hæmorrhage, no signs of delayed shock, but also there were no reasons for the heart to go astray on its own score. Therefore one leaned heavily on the above dicta; there were no known causes or indications to usher in the complication. Extracardiac causes were at work and it soon proved the man was in the throes of an acute pancreatitis which he did not survive.

If proved heart disease does not exist, treatment to that end is misdirected and harmful. It is next to impossible to obliterate the impression from the patient's mind by a corrected point of view. The underlying cause is neglected and hyperthyroidism, deficiency disease, anæmia and psychoneurosis go uncontrolled. It is numerically more tragic to be responsible for countless people given to feel maimed than the few who may suffer through lack of proper detection. Damaged hearts of equal severity will function differently in different bodies. One of the saddest mistakes concerns the diagnosis of angina pectoris. To the layman it is a label of doom but we know there are mild, severe and critical degrees. Unless the extent of morbidity is specified, all sufferers line themselves up in the same hopeless class.

The impetus in the study of minutiæ makes it increasingly difficult to be sure when the heart is normal. A heart may not measure up to all tests of normalcy and yet its condition may not account for referable symptoms. There is the eternal problem concerning functional systolic murmurs, the everlasting paradox of periodic attacks of paroxysmal tachycardia in otherwise sound hearts, the excitement connected with the unstable pulse and frightening symptoms in neurocirculatory asthenia, and many others. Because a cardiac defect is detected, depending, of course, on the degree and extent, one must make reasonably sure it can be justly blamed for the many varied reasons for which such patients come for advice and help. When only suspicion exists, the suspicion is best reserved for one's own knowledge without imparting the doubt. If the doubt lingers, all possible steps to prove the point should be taken. A serious flaw will sometimes escape even the most expert examiner. This is more bad luck than bad judgment. Bad prognoses disable more people than do their hearts.

IS THERE POTENTIAL HEART DISEASE?

It can be stated safely at the conclusion of a comprehensive examination of the heart that there is or there is not heart disease present. There need be no hesitation when the investigation is thorough. Potential heart disease is not something in between. The heart is under indictment on circumstantial evidence and is not yet convicted. The circumstances or the etiological biases stand judgment. Sentence of the heart's complicity is suspended. Foreboding clinical signs serve as warnings anticipating more mature developments.

The most frequently met potential factor is obesity. Obesity is a threat to a healthy heart and a serious burden to an already damaged heart. Extra fat deposit about the heart is not dangerous. In obesity the prime feature is one of dynamics and strain. Unless the heart is already damaged, treatment is directed only towards weight reduction. In a damaged heart weight control is especially necessary when the individual's activities are forcibly reduced.

Another common potential factor is a previous serious febrile illness. Rheumatic fever and chorea are notorious. The heart may escape valvular disease in rheumatic fever and it very frequently escapes valvular disease in chorea. This focus is not always permanently eradicated. Recurrences are frequent. Latent myocardial lesions are possibilities with which one may have to contend in the future. In this part of the country classical rheumatic fever is relatively infrequent compared with the incidence in older and more crowded communities. It is therefore conflicting to find many more mitral lesions and aortic lesions ordinarily associated with rheumatic fever. While mitral stenosis is common, rheumatic fever is comparatively uncommon. It is uncommon as judged by the number of times acute rheumatic fever is encountered and it is uncommon as far as it is elicited in the histories of these patients. Unless many subclinical types of rheumatic infection escape notice, one must consider tonsillitis and allied infections as factors in a train of events duplicating the sequelæ in rheumatic fever.

Characteristic cardiac histo-pathological changes in long-standing thyroid gland disorders are not known. In frank thyrotoxicosis remedial cardiac complications arise. In myxœdema permanent disabilities may remain after the best corrective treatment has been effected.

The many so-called innocent arrhythmias in the absence of any demonstrable cardiac disease are not so benign as to leave us altogether content. It is not possible to refer now to the many more individual potential factors leading to various forms of heart disease.

The heart which stands potentially indicted is not yet condemned. The person may be forewarned and steps are taken to safeguard against evil consequences. The precautions will depend upon the direction from which the threat is coming—obesity, infections, deficiencies, degeneration and physical interferences. The danger signals merit the utmost consideration in adolescence when careers, vocations and futures are planned. Suspicious etiological factors plus evidence of reduced exercise tolerance after excluding a similar handicap resulting from general physical debility, chest diseases and other causes, deserve close scrutiny.

Under the heading of potential heart disease it is pertinent to digress and refer to the problem of prevention in heart disease. Levine states "it seems . . . . too much is being promised by our medical brethren with regard to the prevention of heart disease. Although much is being said, little that is effective has yet been accomplished . . . . the great importance of the subject warns the tremendous agitation that is current."[1] If we are to achieve results in a program to control the high mortality and morbidity, the salvaging process is insufficient. Cure in heart disease is minimal. The best achievement is patchwork, which is not a negligible accomplishment.

In an effort to survey the means of prevention, notice will have to be taken of the following: (1) Early detection of congenital defects. (2) Accurate sifting of those masquerading as cases of heart disease. (3) Special attention and accurate classification of the youthful victims in order to direct them vocationally. (4) Shortening illness but lengthening convalescence. (5) Occupational elasticity with economic security to reallocate the incapacitated for comfort, and productiveness in other jobs. To make it possible to live with disease. (6) Accelerated research in the ravages of the deficiencies and degenerations. To tackle the problem of the withering processes of life. (7) Lastly, to better control vital statistics or not to take them too literally. Too hurried declarations of death are not accurate criteria from which to start.

Is it Acute Heart Failure?

An acute heart attack is, in the broadest sense, a threat of rapid heart failure. The patient is in imminent danger of death. At this stage and at this moment, for practical purposes, the precise cause is subordinate to the immediate need. Help is wanted. In the crisis treatment is urgent. If one has previous

knowledge about the patient, one proceeds with less uncertainty. In the briefest time one learns the onset was sudden, there are or are not characteristic chest pains, the lungs appear to be full or not full of froth, there is or is not known hypertension and there have or have not been previous threats of a similar nature. Signs supersede symptoms: (1) condition—air hunger, suffocation; (2) colour—cyanosis, pallor, ashen grey; (3) pulse — rapid, thready and/or irregular; (4) lungs — congested or œdema; (5) heart—sounds obscured usually; (6) kidneys—suppressed.

This set of circumstances is the result of a last straw, breaking down cardiac compensation. It can crop up suddenly in advanced valvular lesions and in acute and chronic myocardial disease. It develops as a result of a sudden embarrassment induced by severe paroxysmal tachycardias, sudden disturbing arrhythmias, a pulmonary embolism and in the different types of major coronary interferences.

With few exceptions this situation, created by different causes, is met in a uniform manner. In all of them the patient needs relief, the heart needs support, the physician needs time. Even untrained attendants fling the windows wide open. If the facilities are at hand, this need can be augmented by the administration of oxygen. The funnel method is good, the intranasal method is better and from my own experience in these instances the tent method is rarely more advantageous. Great relief is rendered by the administration of ¼ grain of morphine hypodermically. Morphine may be given intravenously. I do not use atropine because it is more to the point to facilitate the removal of bronchial secretions than to suppress them. Therefore, air and sedation come first. Next, without delay, a stimulant is administered. This is furnished by the hypodermic injection of coramine 2 to 5 c.c. or metrazol 1 c.c. or caffeine sodium benzoate 7½ gr., or adrenalin—given every one to two hours during the emergency.

The efficacy of these drugs depends more on what they achieve indirectly than the amount of direct cardiac stimulating properties. A rise in blood pressure is mainly a peripheral effect, diuresis is an accelerated renal action, respiratory relief is central in origin, and what other benefits accrue are probably directly cardiac. Of this group, some favour one or other drug, depending upon the desired accessory functions. Actually adrenalin is the most transitory in its action and caffeine sodium benzoate acts longest. Adrenalin is harmful in acute coronary occlusion. But the danger of increasing myocardial irritability by the use of adrenalin may have to be ignored in the face of severe shock. In acute paroxysmal dyspnœa and so-called cardiac asthma where the chest is "dry" and respiratory embarrassment is severe an intravenous injection of a solution of aminophyllin gr. 7½ gives excellent results. The employment of emergency drugs should not be deferred to a place of last resort when one is trying desperately to keep a hopelessly failing heart going.

Other immediate relief measures include venesection and concentrated intravenous fluids. Venesection is better for high venous pressure than it is for high arterial blood pressure. It is contra-indicated in shock. Concentrated intravenous fluid injections of 50 c.c. of saline or distilled water with 50% glucose is effective for two reasons; it provides an added carbohydrate supply to the heart muscle and at the same time serves as a means of dehydration of the lesser circulation by the withdrawal of fluid from the lungs.

If the foregoing measures do not give the patient, and the physician, at least a temporary breathing space, specific enduring measures will not likely have time to become effective. The effective lasting treatment in acute heart failure is almost entirely limited to the use of digitalis or its derivatives. An adequate dose of digitalis by mouth will act on the heart in two hours, maximum effect in six hours, and produce electrocardiographic changes indicative of the action in that time. Goodman and Gillman, state in support of the foregoing.

> "The hypodermic injection of digitalis preparations is not advised due to the pain, local reactions, and poor absorption characterizing this route of administration. . . . The intravenous route is only warranted when minutes rather than hours may spell the difference between life and death. Patients requiring intravenous digitalis are therefore moribund and emergency measures —have failed. . . . The dose must be carefully calculated and the facts concerning previous digitalis medication must be known. The intravenous route is by far the most dangerous and acute fatality may result from its use. Furthermore, the parenteral administration of digitalis has not the background of the large amount of clinical experience which has accumulated for the oral route of digitalis medication. . . . In coronary thrombosis digitalis is not recommended unless progressive congestive failure ensues."[2]

In all events, when digitalization is decided upon, an organized plan must be pursued. Either total rapid digitalization is desired or partial cumulative digitalization spread over a longer period of time is chosen. Total rapid digitalization is a heroic procedure. In rapid total digitalization the whole amount of digitalis required to fully digitalize the individual is administered in a period of 24 hours. The calculation is based on the need of 1½ gr.—0.1 gm. of the powdered leaf or 15 minims of the standard tincture—for every ten pounds of body weight. The partial cumulative method is effective and safer. One plan is to give half of the total requirement in equal doses every four to six hours the first day, and equal parts of the remainder every six hours the next two days.

The key to intravenous digitalis dosage is based on one-fifth of the amount prescribed for oral use. The following is described by Gold in relation to lanatoside C, namely, 1.5 to 2 mgm. intravenously for total digitalization and ten times the amount by the oral route. Also digitoxin nativelle 1.25 mgm., orally and intravenously alike, is the amount required for total digitalization. The latter product appears capable of complete absorption via the gastrointestinal tract.[3]

The causes of acute heart failure were spoken of in bulk. In some instances the specific cause of the acute failure is immediately recognized. Two are outstanding. In the onset of some types of arrhythmia threatened with heart failure there is usually adequate time to determine the correct medicinal requirement for the specific arrhythmia. In acute coronary occlusion it is recognized quickly the shock demands attention in advance of specific heart therapy. Incidentally bacterial endocarditis is a focal lesion in what is a matter of septicæmia and the aim in treatment is accordingly.

Is it Chronic Heart Failure?

A damaged heart, from any cause, in any of its component parts can ultimately drift into the class of chronic heart failure. This applies to chronic valvular disease, chronic myocarditis, constrictive pericarditis, serious arrhythmias, and coronary insufficiencies. A sweeping statement relegating all forms of chronic heart disease to one class, raises the question concerning the place of the patient with angina pectoris or the patient with paroxysmal dyspnœa, the patient with aortic sclerosis and hypertension. Briefly, it can be said, that in all of them the heart does not meet the patients' needs. They experience limitations of different forms manifesting cardiac incompetence. Unless some mishap overtakes them too soon, the full complement of congestive signs eventually appear. Irrespective of the initial cause, the end-result is the same. Conversely, chronic congestive heart failure is an entity despite the pedigree. Consequently, treatment does not usually entail the burden of making special allowances in respect to the cause. There are some exceptions, for example, constrictive pericarditis and pericarditis with effusion which require additional physical measures for relief.

In acute heart failure the signs supersede the symptoms. In chronic heart failure the symptoms out-number the signs. Although the signs are few they are positive. But symptoms such as fatigue, exhaustion, weakness, and even dyspnœa may not justify the implication. I recall an instance of extreme dyspnœa, which was in reality hyperpnœa, the result of prolonged salt deprivation and consequent alkalosis. The precise classification of the grade of cardiac incapacity takes time and attention.

The common symptoms are: dyspnœa, orthopnœa, palpitation, cough, vertigo, weakness, precordial pain.

The signs are, cardiac—anatomical lesions; congestive features—visceral engorgement and peripheral œdema.

Heart failure is a matter of degree. Early phases of decompensation permit individuals to remain ambulatory until such time as a totally reduced functional capacity necessitates complete bed rest. The greater number belongs to the invalid ambulatory class. Compared with acute heart disease, which is subject to overtreatment, chronic heart disease is subject to inadequate treatment. In acute heart failure drugs take precedence. In chronic heart failure rest measures come first. Limitations should be imposed only as befits the case. There are no set formulæ. A forecast imposing in advance long periods of rest in bed for six and twelve months is not a guarantee of predictable benefits. It takes as long to become adjusted to the upright position which is a

matter of importance when the confinement was not altogether justified.

In planning the medicinal course, treatment is dictated by four conditions: (1) Does the myocardium need re-inforcement? (2) Does the existing rhythm need stabilizing? (3) Do peripheral barriers exist? (4) Does the coronary circuit need assistance? It is possible that all four problems exist at the same time and often all are taken care of by one manœuvre.

1. For re-inforcement of the myocardium, the digitalis group of drugs comes first. Quinidine and caffeine come next in the order mentioned. Digitalis therapy calls for an adequate therapeutic dose sufficient to influence the heart rate and affect diuresis. It is best to start by estimating the total amount of the drug required. The dosage is divided and spread over the number of days it is intended to obtain the optimum effect. This has the advantage of affording an opportunity to interrupt treatment as indications arise.

2. To correct arrhythmias, digitalis, quinine, magnesium sulphate intravenously, acetylcholine (mecholyl), barium chloride and sedatives are used. Digitalis with special mention of lanatoside C (Cedinalid-Sandoz) and quinidine are used in auricular fibrillation and auricular flutter. Intravenous magnesium sulphate and acetylcholine are used in obstinate acute paroxysmal tachycardias. Adrenalin, ephedrine and sometimes barium chloride may be required in complete heart block with Adams-Stoke syndrome. For troublesome extrasystoles sedatives are usually sufficient and it is equally important to remove exciting causes such as tobacco, tea, coffee and flatulency. Correction of an arrhythmia which was sufficient to embarrass the heart and induce failure will of itself take care of the decompensation.

3 and 4. **The chief peripheral barrier is renal insufficiency. A transitory insufficiency is produced by an increased capillary filtration pressure due to a rise in the general venous pressure.** This is caused by a failing heart and is corrected when the cardiac force is restored. More often there may be combined cellular renal damage. The immediate outward manifestation of renal insufficiency is œdema of the subcutaneous tissues. In some instances, the conspicuous signs of passive congestion are localized in some internal viscera. Basal pulmonary congestion or pulmonary œdema may be foremost. The liver alone may be acutely engorged, large and tender. Ultimately, so-called cardiac hepatic cirrhosis develops. The first step to counteract congestion is a reduction in the fluid and salt intake. It is necessary to forcibly reduce the total fluid intake, not below 1,500 c.c. in 24 hours in the average adult. The use of mercurial diuretics accelerates the dehydration process by their action in reducing renal tubular reabsorption of water. Acid-forming salts increase the potency of the mercurial diuretics. Therefore, the administration of ammonium chloride in 20 to 40 gr. doses four times a day preceding the injection of mercurial preparation increases the diuresis. Preparations are available for use by intravenous, intramuscular, oral and rectal routes. As a check on the efficacy of the treatment, a chart kept of the patient's weight is a splendid control. The xanthines, caffeine, theobromine and theophylline are prescribed in stages demanding less stringent action. They are used when the side-reaction of vasodilation is also desired. The nitrites, more specifically nitroglycerine, are seldom required in chronic heart failure because it is strangely noted that with the onset of congestive failure, anginal pains diminish or disappear. As a reminder—intractable œdemas in chronic heart disease may be produced by such complicating factors as hypoproteinæmia and vitamin B deficiency. Occasionally concurrent myxœdema may also lead to some error.

Maintenance medicinal therapy is conducted as follows: a daily dose of gr. 1½ digitalis leaf will supplant the amount normally eliminated in 24 hours. In some people a slight accumulation may occur even with this minimal dose. That may be taken care of by ordering the patient to abstain one day a week. When dealing with recurring paroxysmal auricular fibrillation or paroxysmal tachycardia and the frequently occurring but less readily detected paroxysmal attacks of auricular flutter one, two or three tablets of quinidine gr. 3 daily is prescribed. In angina vera nitroglycerine is used as a specific for pain. For prophylactic purposes in impairment of the coronary circulation theobromine or theophylline often combined with phenobarbital are the drugs of choice.

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RÉSUMÉ

En présence d'une cardiopathie probable, le clinicien doit se poser les 4 questions suivantes: (1) le cœur est-il la cause des symptômes observés? (2) Est-il possible que le cœur devienne atteint? (3) S'agit-il d'une défaillance cardiaque aigue, ou, (4) chronique? Lorsqu'une cardiopathie n'est pas évidente, il est bon de se demander si le malade a déjà présenté des foyers toxiques ou infectieux, s'il est porteur d'une maladie chronique, s'il est privé de quelque aliment ou vitamine essentiels, s'il présente des anomalies thoraciques et s'il a subi un traumatisme. Un cœur suspect peut devenir effectivement touché dans l'obésité, à la suite de maladies fébriles, notamment du rhumatisme aigu et des amygdalites. Si l'on est en présence d'un collapsus aigu il s'agit d'apporter un soulagement immédiat; à cet effet les médications héroïques sont signalées. Si par ailleurs, nous sommes en présence d'une décompensation chronique et progressive, l'intervention immédiate cède le pas en importance aux mesures d'hygiène et à l'organisation rationnelle du traitement. Il s'agit selon les cas, de renforcer le myocarde, de stabiliser le rythme, d'amoindrir le barrage périphérique, d'aider la circulation coronaire. Les médicaments appropriés à chaque cas sont décrits et discutés. JEAN SAUCIER

INTRAMEDULLARY TRANSFUSION

By Fergus J. O'Connor, Jr., M.D., C.M.

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SINCE the reports by Drs. Tocantin, O'Neill *et al.*,[1, 2, 3, 4] on the transfusion of blood plasma and other fluids into the medullary cavities of the sternum and long bones, many others have reported on this method particularly as an advancement in pædiatrics. The value of this procedure is ever becoming more evident. Only recently Arbeiter and Greengard[5] reported a series of 43 infusions with 81% complete successes. Meola[6] reported on 144 patients receiving infusions, making a total of 326 infusions.

While the original work was done on the sternum and long bones, it has been found in pædiatrics that the sternum is of value only in older children. The site of usual election is the upper end of the tibia or the lower end of the femur. Both of these sites are readily available —the marrow cavity is of such a size that it facilitates absorption and very few, if any, untoward effects are reported. Tocantins[4] reports absorption rates varying from 0.4 to 9 c.c. per minute.

The technique of intramedullary infusion is readily acquired and is as quickly carried out as venipuncture. The equipment necessary is relatively small. The needles, as designed by Dr. Harry Turkel, consists of the bone needle with its stylet and with a guard that is adjustable on the shaft, a drill with a notched end and stylet to fit. The set-up includes two of these needles of different length, a 2 c.c. syringe for local anæsthetic, a 20 c.c. syringe and sterile basin of saline, sterile towels for draping, scissors and skin antiseptics, and any standard method of administering blood, *i.e.*, Baxter set or otherwise.

The routine, to reiterate, is as follows: (1) The leg is fixed to a leg board with the toes pointing upward and adhesive straps holding the foot to the foot piece—holding across the ankle and across the patella. (2) The leg is prepared as for a major surgical procedure, thus avoiding the omnipresent possibility of introduction of disease-producing organisms into the bone marrow. (3) A local anæsthetic is introduced into the skin over the area of choice and the tissues infiltrated down to the periosteum. (4) The introduction of the needle is described for the tibial tuberosity. The shaft of the tibia is palpated and the tuberosity held between the forefinger and thumb of the left hand. The needle with the stylet in place is inserted through the anæsthetized skin at an angle of 75° and passed downward to the bone with the point directed distally so that the bevel lies parallel to the tibia. By pointing distally the needle avoids the epiphyseal plate. The stylet is removed and the hollow drill inserted into the bone needle. Holding the needle with the left hand, the head of the drill is rotated to and fro with downward pressure until it "drops" softly into the medullary cavity. The drill now fits the outer needle. The outer needle is pushed downward about 6 mm. and is now firmly fixed in the marrow cavity. The drill is withdrawn and the saline filled syringe fixed to the needle. If it is in place, marrow will draw into the syringe on aspiration, and the saline may be injected into the medulla with very little pressure. The infusion is started by rapidly changing from the syringe to the infusion set after cleansing the needle by injecting saline through it.

When the infusion has been completed the needle is removed by steady traction with slight

rotation, and the site of entry covered by a sterile dressing.

Four typical cases have been selected. One is the case of a child who had previous transfusions by cut-down at the ankle and needed a new route; another because of burns had badly scarred ankles and one arm scarred; another was very dehydrated and with typically flat veins, and another was an obese child requiring blood because of severe secondary anæmia.

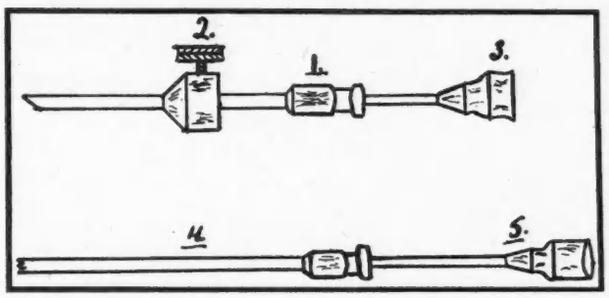

Diagram shows bone needle 1, with guard 2, and stylet 3, bone drill 4, and stylet for bone drill 5. Bone drill is of such a diameter that it fits within the bone needle 1.

CASE 1

C.C., aged 8 months, previously transfused in both ankle veins and readmitted to hospital because of severe diarrhœa and vomiting over three weeks' duration. Weight: 12 lb. 14 oz. Hæmoglobin: 88%.

Seventy-five cubic centimetres of saline and 65 c.c. plasma infused into right tibia. Time required: 1 hour and 20 minutes.

CASE 2

S.G., aged 1 year, diarrhœa, acute bronchitis, scarred ankles and left arm from previous severe burns. Weight: 18 lb. Hæmoglobin: 42%.

Readily transfused into right tibia, 25 c.c. saline, 125 c.c. blood by gravity from Baxter set in 1 hour and 30 minutes.

CASE 3

G.H., aged 4 months, diarrhœa, three weeks' duration. Weight: 10 lb., 5 oz. Hæmoglobin: 65%.

Transfused readily with 30 c.c. saline, 75 c.c. blood by gravity method in 1 hour.

CASE 4

L.A., aged 10 months. Overweight child, very pale. Early left lobar pneumonia. Hæmoglobin: 68%.

Received 150 c.c. blood by syringe method into right tibia in 35 minutes.

SUMMARY

1. A brief review of the literature on intramedullary transfusions is given.

2. A routine for the procedure is given and four typical cases reported.

3. It is concluded from the present findings that if considered as a surgical procedure and carried out under sterile technique the intramedullary method of transfusion is a valuable adjunct to the treatment of children, as a rapid and simple method of administering fluids, plasma or blood.

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STONE IN THE LOWER (PELVIC) URETER*

By Earle R. Hall, M.D.

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I WISH to present a series of 42 cases having a urinary calculus in the lower (pelvic) portion of the ureter, or that part below the pelvic brim. This is a review of patients from private practice during the past ten years, and I have selected only those cases having a stone in this portion of the ureter when they first came under my attention. In my remarks I wish to deal chiefly with the management of this type of case.

I have divided these into the following five groups based upon treatment and the end result of each.

Group 1.—Closed methods with a known result.

Group 2.—Open methods with a known result.

Group 3.—Cases having no treatment and the result known.

Group 4.—Cases having no treatment and the end result unknown.

Group 5.—Cases having treatment elsewhere and the result known.

Group 1.—There were 21 cases and the closed methods of treatment consisted of some type carried out by endoscopic means; two methods were used.

First closed type.—Cystoscopy with ureteral dilatation by passage of bougies or catheters, followed by injection of 7 to 10 c.c. of sterile oil through a ureteral catheter. Three of the 21 cases were treated in this manner. In each instance the stone was successfully passed. In

* Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Urology, Toronto, Ontario, May 24, 1944.

one this occurred five months after it was first recognized and during this time four injections of oil were given. In the second, the calculus passed into the bladder eight days after oil injection, but having a prong formation became impacted in the posterior urethra. It was easily removed after being pushed back into the bladder by a large metal catheter through which it was aspirated with suction from attachment to a Bigelow pump. The third case passed the stone within 6 weeks, during which two injections of oil were used.

Second closed type.—Cystoscopy and incision of the ureteral orifice by means of an electrode with an incising tip and the electric cutting current. This was carried out in 18 cases. Fourteen of these recognized the calculus when it passed, the earliest being eight days after the ureteral meatotomy and the latest in six weeks. While the other four cases had no knowledge of the actual passing of the stone, in each there was complete relief from symptoms and x-rays two to four months later were completely negative for evidence of the previously existing stone shadows.

Group 2.—There were 8 cases and the calculi were successfully removed in all by open methods of treatment. In 7 this consisted of laparotomy with exposure of the pelvic ureter and extra-peritoneal ureterolithotomy then carried out. In one, the stone was removed from the intramural portion of the ureter by laparotomy with cystotomy and enlarging the ureteric orifice within the bladder cavity.

In this group a suprapubic midline incision was used in all. To me, it appears the easiest approach for exposure of the whole length of the pelvic ureter and gives more room to the operator for manipulation. With a median incision the bladder, if necessary, can easily be opened without making a new incision. I found this to be of great assistance in two cases where the calculus was in the ureter just outside the bladder. On account of adhesions I was unable with satisfaction to locate this part of the ureter and the stone, until I had the advantage of one finger within, and another just outside the bladder.

Using a median incision I have never experienced difficulty in stripping the peritoneum from the lateral wall of the pelvis. This is done by inserting the finger into the space between the bladder and the pelvic wall and pushing the peritoneum upwards and inwards towards the mid line. The ureter remains adherent to the peritoneum and is retracted in with it. As a result it can usually be located if one does not make the mistake of looking for it on the pelvic wall. For this reason I think it is important to remember that it is always retracted inwards with the peritoneum.

During the operation on one of the cases in this group I had retracted the peritoneum and located the stone in the upper part of the pelvic ureter which showed extensive peri-ureteritis and adhesions. When the ureter was finally separated and ready for incision I could no longer feel the stone. Careful search below failed to show any sign of it. I concluded that it had passed upward above the pelvic brim. The patient being in the Trendelenburg position, I had the feet lowered and the head of the table raised. I was then just able to pick up the calculus in the ureter just above the pelvic brim, it apparently dropping back and down again following the reverse in position of the patient. I was then able to manipulate the stone to a point lower down in the ureter from which it was easily extracted.

Group 3.—Six cases in this group had no treatment and successfully passed their calculi. One of these apparently had the calculus pass into the bladder the night before a ureteral meatotomy was to be done, as the next morning at cystoscopy the stone was observed on the base of the bladder. It was then readily aspirated by suction through a metal catheter. Three of the cases recognized the stone on passing. This occurred from three to ten weeks after first being attended. The other two had no knowledge of passing a calculus. They had for a few weeks after being diagnosed, occasional burning with urination and then complete absence of any of the previous symptoms. X-rays 6 months later were completely negative. When these 6 cases first came under my attention I carried out cystoscopy and retrograde pyelography for diagnosis. Apart from the passing of ureteral catheters for this purpose, there was no other instrumentation to assist in the passing of the stones.

Group 4.—There were 6 cases in this group, having no treatment other than cystoscopy and ureteral catheterization for pyelography, as carried out with the cases in the preceeding groups. The end results of the cases in this

group however, are unknown to me. Following the establishment of the diagnosis 2 of these 6 cases disappeared entirely from sight with no further word of progress being learned. The other four were heard from at intervals up to a period of several months during which they had no symptoms and no knowledge of passing a stone. Following this they disappeared from sight and their end results also remain unknown.

Group 5.—There was one case in this group; he was treated elsewhere and the result known. This man when first coming under my attention had a large stone in the pelvis of the right kidney and an impacted calculus in the ureter just below it on the same side. He also had a calculus in the lower (pelvic) ureter on the opposite side. I removed the stone from the right kidney and also the impacted calculus from the upper part of the right ureter. Following this he had no pain, the stone in the lower left ureter apparently remaining quiescent. It appeared much too large to pass and I advised laparotomy and extra-peritoneal ureterolithotomy. He declined further operative treatment at this time and returned to work. He was in the Merchant Navy and following the first trip to England had considerable pain and onset of infection. This stone was then removed in Liverpool.

CHOICE OF PROCEDURE

As previously stated, these cases when first coming under my attention all showed a calculus within the ureter at some point between the pelvic brim and the ureteral orifice. I have not included those in whom a calculus has been followed or assisted down from the renal pelvis or the first and lumbar portions of the ureter. When this occurs the problem of removing or having the stone pass remains unchanged.

When confronted with a shadow suggesting a ureteral calculus located within the pelvic ureter, it is obviously necessary to prove that the condition is one of stone in this region. Generally this is not difficult as history usually discloses one or more attacks of pain suggestive of ureteral colic and together with urinary findings makes one think of the possibility of a stone existing.

I think it is good practice to pass a ureteral catheter as an aid in diagnosis. In the pelvis there are often other shadows such as phleboliths and calcifications together with a possibility of more than one urinary calculus being present. For this reason, with a ureteral catheter or bougie in place, a Kretschmer shift exposure will determine to the ureter. At the same time urine can be obtained and pyelograms made to determine the condition of the kidney. One also obtains some idea as to whether the blockage is complete or partial. This is necessary to decide whether one can give the stone a chance to pass, with perhaps some assistance or whether to adopt more radical surgical procedures.

It is particularly gratifying to see how soon stones were passed following the relatively simple procedure of ureteral meatotomy.

Of the 8 cases having laparotomy, six had stones which had been present from 1½ to 2½ years, and appeared much too large in size to pass. The other two, while having large stones also had marked infection of the kidney above, thus making surgical intervention necessary.

Before concluding I would like to mention that these cases fell into an age group from 16 to 82 years. In Group 2 of the laparotomy cases it is of interest to note that the first and last case was each a girl of 16 years.

In all cases the kidneys had no permanent damage and follow-up records of those having operative procedures showed an apparent recovery from any infection which had been present. One of the cases in Group 1 was a ureterocele complicated by stone. The latter was successfully passed ten days after fulguration of the ureterocele.

Of the 18 cases having ureteral incision, I have cystoscoped 14 following expulsion of the calculi. This was to determine the appearance of the orifice and to learn if there was any tendency to stricture formation. These cases showed no change in appearance from a normal opening. Passage of catheters in all showed not the slightest stricture or contraction.

In conclusion, I wish to stress the rôle of conservative treatment. When one first meets this type of case and the accompanying factors are favourable, then, in my experience, good results can be obtained by methods which are far from radical in their application.

Medical Dental Bldg.

A person's age is not dependent upon the number of years that have passed over his head, but upon the number of colds that have passed through it.

—Woods Hutchinson.

ISLET CELL TUMOURS OF THE PANCREAS*

By Louis J. Breslin, M.D.

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ISLET cell tumours were first described by A. G. Nicholls in 1902. With the discovery of insulin by Banting and Best in 1922 came an understanding of the hypoglycæmic syndrome. Two years later Seale Harris[1] suggested that islet tumours were able to produce this syndrome. In 1929 Howland, Campbell, Maltby and Robinson[2] reported the first clinical diagnosis of an islet cell tumour. Their patient who is still alive was successfully operated upon by R. R. Graham.

The incidence of benign islet tumours has been differently estimated by various authors. Duff[3] quoting Campbell, Graham, Robinson and others states that they are encountered in 1 out of every 1,000 autopsies. Brunschwig[5] in his recent textbook made a survey of the literature up to 1942 and tabulated approximately 134 such cases—several others have since been reported.[6, 7, 8, 9] Duff in his article enumerates twelve cases of malignant islet cell tumours. This may be contrasted with the frequency of carcinoma of the pancreas in general, which according to Schnedorf and Orr[4] constitutes 1 to 2% of all malignancies. Less than one-fifth of them are recognized clinically or found following surgical intervention. The author in his discussion of the pathogenesis and histopathology of such tumours refers to the difficulty ofttimes encountered in differentiating benign from malignant tumours. This has likewise been emphasized by Franz.[10] Hanno and Banks[11] summarize 22 cases, to which should be added a recent case reported by Browning[12] and Brunschwig, Allen, Owens and Thornton.[13]

Quoting from O'Leary and Womack,[14] and Laidlaw[15] Duff states "that islet cell tumours represent the response of pancreatic duct epithelium to a stimulus which calls into action its islet forming potentialities and to a lesser extent its ability to build ducts, while its power to form pancreatic acinar tissue remains virtually in abeyance". He divides such tumours into three categories: (*a*) Definitely benign adenomata. These may however at times present the histological appearance of malignancy. (*b*) Definitely malignant tumours metastasizing not only to the regional lymph nodes but to the viscera and other distant parts of the body. (*c*) Tumours which present the appearance of low grade malignancy even metastasizing to regional lymph glands but which following extirpation do not present evidences of further metastases.

Brunschwig states "that successfully excised malignant islet cell tumours have behaved like benign lesions in that there has been relief of symptoms, and that metastases not found at the first operation did not subsequently develop". Those interested in the subject are referred to the articles of O'Leary and Womack,[14] Laidlaw,[15] Bensley,[16] Campbell, Graham and Robinson,[17] and Brunschwig's textbook, which deal fully with the histopathology of islet cell tumours.

From the clinical or functional point of view Duff divides islet cell tumours into two categories, *viz.*, those which produce the hypoglycæmic syndrome in accordance with the three postulates of Whipple[18] and those which do not. With respect to benign adenomata it is significant that the average time intervening from the onset of symptoms to attempted surgical cure has been approximately 3.6 years, varying from 5 months to 12 years.[7, 12] Many of them in fact remain unrecognized until discovery at autopsy. Malignant islet cell tumours in the absence of the hypoglycæmic syndrome are even less likely to be recognized and according to Duff produce a clinical picture which can not be distinguished from that of any other type of "pancreatic carcinoma". The duration of life in such patients has only exceeded 12 months in one case recently reported by Brunschwig.[19] It therefore becomes apparent that this type of pancreatic carcinoma, particularly in the absence of a hypoglycæmic syndrome is much more difficult to diagnose clinically or preoperatively than are the usual neoplasms of this organ. In the latter one commonly encounters obstructive and so-called painless jaundice of the Courvoisier type. Liver function tests such as the Van den Bergh, cephalin-cholesterol flocculation, intravenous hippuric acid, serial or fractional bromsulphalein, estimation of prothrombin time following administration of vitamin K, are according to Mateer and his associates[20] ofttimes of assistance in this regard. The estimation of blood amylase and

* Presented before the Mount Sinai Clinical Society, Toronto, November, 1944.

even more so lipase have been advocated by Comfort and Osterberg[21] and Johnson and Bockus.[22]

Gastroscopy and x-ray examination in certain selected cases may according to Brunschwig prove to be valuable aids. The reader is referred to his textbook for a full discussion of the symptomatology and differential diagnosis of pancreatic tumours.

The following case is being reported because it presented itself primarily with obstructive jaundice of fairly long duration and on exploration proved to be a case of islet cell carcinoma of the beta type, which invaded not only the body but also the head of the pancreas, and a regional lymph gland. This patient according to a personal communication from one of her previous attending physicians on one single occasion showed a fasting blood sugar of 25 mgm. During her stay in the hospital she did despite normal blood sugar levels exhibit signs and symptoms which I considered to be evidence of dysinsulinism, particularly with respect to their abrupt cessation following glucose administration. The tumour evidently belongs to group three of Duff's classification.

CASE REPORT

The patient was a married white female, para 2, 34 years of age, who gave an entirely negative past medical history except for one single episode in 1938 which may have been due to an attack of biliary colic. There was no preceding jaundice. Her family history was quite irrelevant. In May of 1943 she began to complain of pruritus affecting chiefly the soles of her feet, all extremities and ultimately the entire body. She consulted several local physicians without obtaining relief. At the end of three months she exhibited frank jaundice, *viz.*, discoloration of skin and scleræ, passage of dark urine, and frequently pale stools. She lost strength and weight, progressively going down from an optimal weight of 118-120 to 87 pounds as of the day when I first examined her on March 11, 1944.

The patient was investigated in February of this year at one of the largest American clinics and discharged with the diagnosis of biliary cirrhosis. By this time the itching was intolerable; her whole body was in fact covered with thousands of scratch marks some of which had become infected. Due to prevailing scarcity of private room hospital accommodation she was treated until March 21, 1944, first at home and then in one of the smaller private hospitals.

The following is a résumé of my findings: "An emaciated, badly dehydrated jaundiced woman who was barely able to partake of water and fruit juices. Her various body systems were essentially normal except for a tender liver palpable three fingers below the costal margin and a rather ovoid mass which I considered to be an enlarged gall bladder. One could palpate a second firm, fixed tumour mass which did not move upon respiration, in the epigastrium. The spleen could barely be felt. Rectal and vaginal examinations were negative. There was no accompanying demonstrable adenopathy. Leucocytes 16,500, hgb. 82%, red cells 4 million—some polychromasia and anisocytosis present—platelets normal. Prothrombin time 14 seconds, bleeding time 2½ minutes, clotting time 7 minutes. Fragility test normal. V.D.B. ranged from 8 to 15 units. Serum protein 5.29, albumin 2.13, globulin 3.06. Non-protein nitrogen 0.23%. Serum phosphatase (Kay Jenner) 50.4 units. Serum amylase (method ?) 42 units—normal contrast done at same time 24 units. Blood lipase was not obtainable. Fasting blood sugar ranged from 0.089 to 0.113%. Urine showed albumin 2 plus, bile 3 plus, faint trace of urobilin, occasional white blood cells, no sugar. Stools were greyish in colour, contained excess total fats, no bile present. Benzidine test negative. A flat scout x-ray film of the abdomen revealed a large ovoid shadow in the right upper quadrant in intimate contact with the inferior border of the liver. Subsequent barium series showed a crescentic-shaped distortion at the superior border of the duodenal cap.

The patient was given 5% glucose intravenously, put on a semi-liquid high carbohydrate, liberal protein and fat free diet supplemented with ample vitamins including vitamin K. Following transfusion she was operated upon by Dr. R. Janes at the Toronto General Hospital on March 31, 1944. A large thick-walled gall bladder about 4 x 1½ inches filled with stones and thick bile was found. The common duct was patent. Posterior to the duodenum and in the region of the ampulla was a hard mass extending into and consisting of both head and body of the pancreas. Lying above it was a cystic swelling, whilst posterior and in juxtaposition to the lower end of the common duct was a firm large lymph gland about 1½ x 2 cm. This was removed, the cyst opened and 10 c.c. of grumous material aspirated, the gall bladder opened by trochar, its contents evacuated and a cholecysto-gastrostomy performed. A portion of the liver edge which extended three or four fingers' breadth below the costal margin was likewise removed for biopsy.

Pathological report by Dr. W. L. Robinson was: (1) Primary islet cell carcinoma of the pancreas of Beta type. (2) Secondary carcinoma of regional lymph gland. (3) Hepatic biliary cirrhosis. (4) Cholelithiasis.

The patient made an excellent recovery except for a complicating genito-urinary infection due to *Strep. fecalis* which finally responded to treatment. She suffered on several occasions from attacks of nausea and vomiting accompanied by mental confusion, and periods of restlessness, profound weakness and at times marked perspiration, each of which cleared up promptly following intravenous administrations of 5% glucose. The interns were unfortunately unable to obtain proper blood samples for estimation of blood sugar levels during such episodes. The patient when discharged on May 8, 1944, was quite ambulatory, the wound was almost completely healed. She required multiple small feedings throughout the 24 hours.

Glucose tolerance test at this time showed a diabetic curve:

	Blood sugar	*Urine*
Fasting	125	0 sugar
One-half hour	272	trace
One hour	300	3 plus
One and one-half hours	187	4 plus
Two hours	100	0 sugar

On October 15, 1944, she weighed 104½ pounds, felt well, and enjoyed her meals. The epigastric mass although still present had not increased in size. She requires 15 units P2 insulin to render her sugar free on a daily intake of carbohydrate 250 gm., proteins 60, fat 60. There has been no recurrence of jaundice. Repeated V.D.B. gave a reading of 0.2 units. Urinary examination likewise negative. Stools studied in the gross and microscopically after application of Sudan III and Lugol's iodine reveal satisfactory digestion of fats and proteins.

DISCUSSION

This case is presented firstly because malignant tumours of the islet cell are quite rare, secondly because the outstanding clinical manifestations were those of jaundice and its sequelæ and, thirdly, because the patient although not exhibiting a definitely proved hypoglycæmic syndrome in conformity with the three postulates of Whipple did I believe manifest signs of dysinsulinism. Brunschwig and others point out in this connection that the value of blood glucose estimations, and conformity of glucose tolerance tests largely depend upon the accompanying nutritional state and the extent of glycogen and fat storage in the liver.

It is conceivable that this patient's islet cell tissue was in part at least undergoing changes designated by O'Leary and Womack as indicative of "non-specific mass". These have now progressed to such an extent as to make her definitely a diabetic. The question of total extirpation has been mooted but declined by the family. Priestley, Comfort and Radcliffe[23] recently reported such an operation in which their patient has now remained in good health for over sixteen months. Alloxan[1] has not been used therapeutically in this case.

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A POSSIBLE EXPLANATION OF CONFLICTING RESULTS IN EXPERIMENTS WITH TRANSPLANTED TUMOURS*

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THE evaluation of any treatment of neoplasia is made by determining its effect on the number of takes, or the number of tumour regressions, or changes in the rate of tumour development and growth. Reports in the literature on various methods of treatment applied to animals bearing tumours produced by transplantation of neoplastic tissue, are often contradictory. This is true even when care has obviously been taken in the experimental technique. C. Voegtlin[1] states, "If one desires to study the influence of chemical factors on tumour growth it is essential to use an experimental procedure above criticism". He then sets forth six guiding principles: (1) Suitable type of tumour. (2) Large number of animals in the group to eliminate variation. (3) Evaluation of complicating tumour ulcerations or intercurrent infections. (4) Results obtained by intratumoural injection are valueless. (5) Dietary control from point of view of nutritional states, which might have been influenced by interference with food supply by the use of the chemicals. (6) The results obtained with one type of tumour may not hold when other types are used.

A close examination of many of the reports in the literature reveals the possibility that varying results might be explained by another important factor not included in the above list, namely, the absence of uniformity in the method of tumour transplant.

Two methods of tumour transplantation are in common use; the method of trochar and cannula, and the inoculation with cell suspensions.

The first of these, namely the trochar and cannula method, is usually performed in the following manner. A piece of active tumour tissue, after having been removed under sterile conditions from the animal is placed in a sterile Petri dish, along with a small amount of physiological saline solution. It is teased out with needles into

* From the Hendry Connell Research Foundation, Kingston, Ontario, Canada.

small fragments and these are pushed into the mouth of a fairly large size cannula. The cannula is then introduced under the skin at the selected site in the experimental animal and the trochar is introduced to force the tissue fragment out of the cannula and into the tissue of the host where it is left embedded.

In the second method, (tumour cell suspensions) the tumour-bearing donor animal is killed and the tumour dissected out aseptically. Active peripheral sections of the tumour are cut and transferred to a sterile mortar, ground well and normal saline added to make a smooth suspension. This emulsion is drawn up into a syringe and injected into the recipient animal at the site chosen. In many of the papers in the literature no record is given of the concentration of tumour material used.

From this brief outline of the two methods, it can be readily seen that very considerable variation both in the number of tumour cells and the amount of connective tissue elements transplanted is bound to occur. This will have a marked effect on the results obtained.

It is obvious that the cell suspension method offers more opportunity for control than that of the trochar and cannula. In the cell suspension method most of the connective tissue elements are removed before transplant, and the number of cells per ml. of suspension can be fairly accurately controlled.

The fundamental importance of a standard technique in determining the number of takes, the rapidity of tumour growth and the incidence of spontaneous regressions is shown by the following experiments. In these experiments reported below the only varying factor is that different amounts of the same tumour cell suspension were used.

EXPERIMENTAL

A mouse bearing an actively growing Belough sarcoma was selected and from the tumour of this donor animal a cell suspension was made as follows:

The animal was beheaded and allowed to bleed out. A sterile table was prepared upon which a board was placed suitable for fixation of the animal to facilitate exposure of the tumour mass. The skin of the operative area was sterilized by soaking with alcohol which was allowed to dry for a moment or two then wiped with sterile cotton swabs. A section was made through the skin to the outer margin of the tumour; then by blunt dissection, the tumour mass was exposed, but not removed from the animal. Small sections of active peripheral tumour cells were removed with sterile instruments and placed in a sterile Petri dish on a balance which had been previously adjusted so that the scale will come to zero upon the addition of 1 gm. of tumour tissue.

The tissue sections were transferred to a sterile mortar and ground well before the addition of fluid. Two ml.'s of sterile Tyrode solution was added, and the grinding was resumed

TABLE I.

GROUP 1 (0.2 ML. TUMOUR CELL SUSPENSION)

Day	*No. of mice in group*	*No. with tumours*	*No. without tumours*		*Average circumference of tumours present (mm.)*	*Average tumour circumference for group, mm.*	*Deaths*	*Remarks*
			No.	*% of original animals*				
0	22	0	22	100	....	....	0	
2	22	14?	8	36	....	....	0	Definite swelling at site of injection.
3	22	22?	0	0	....	....	0	Too small to measure.
5	22	22	0	0	33.7	33.7	0	Measurable size.
7	22	22	0	0	37.9	37.9	0	
9	22	22	0	0	40.0	40.0	0	
11	22	22	0	0	43.7	43.7	0	
12	22	22	0	0	49.3	49.3	0	
13	22	22	0	0	47.6	47.6	0	
14	22	22	0	0	47.0	47.0	0	
16	22	22	0	0	48.2	48.2	0	
20	22	22	0	0	48.1	48.1	0	
23	22	20	2	9	49.8	45.3	0	
25	22	19	3	14	53.8	46.5	1	Tumour death.
27	21	18	3	14	57.0	49.0	1	Tumour death.
30	12	9	3	14	47.0	35.2	8	
47	7	3	4	18	83.7	35.8	5	
51	6	2	4	18	....	....	1	
54	4	0	4	18	....	....	2	

TABLE II.

GROUP 2 (0.05 ML. TUMOUR CELL SUSPENSION)

Day	No. of mice in group	No. with tumours	No. without tumours		Average circumference of tumours present (mm.)	Average tumour circumference for group, mm.	Deaths	Remarks
			No.	% of original animals				
0	16	0	16	100	....	....	..	
2	16	0	16	100	....	....	..	
3	16	3?	13?	81?	....	....	..	
5	16	3	13	81	....	....	..	
6	16	3	13	81	....	....	..	
7	16	7*	9	56	23.5*	10.3*	..	*Not all tumours of measurable size.
8	14	11	3	21	14.2	11.2	2	
9	14	13	1	7	13.1	12.2	..	
10	14	13	1	7	24.6	22.8	..	
12	14	13	1	7	25.1	23.3	..	1 escaped.
13	13	12	1	7	41.9	38.7	..	
14	13	11	2	13	44.3	37.5	..	
16	13	9	4	25	42.2	29.2	..	
19	13	7	6	38	44.8	24.1	..	
21	13	7	6	38	44.8	24.1	..	
22	13	5	8	50	49.6	19.1	..	
23	13	6	7	44	49.4	21.4	..	
26	13	5	8	50	57.1	22.0	1	sacrificed.
28	12	4	8	50	56.4	19.0	..	
31	12	4	8	50	59.7	19.1	..	
34	10	2	8	50	51.8	10.3	2	
47	10	2	8	50	72.2	14.4	..	
51	10	2	8	50	78.5	15.7	..	
54	10	2	8	50	86.3	17.3	..	

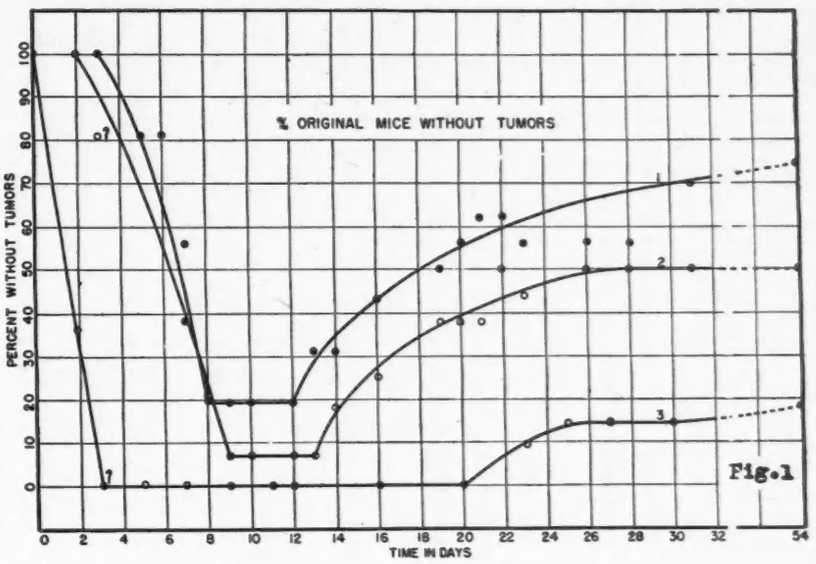
TABLE III.

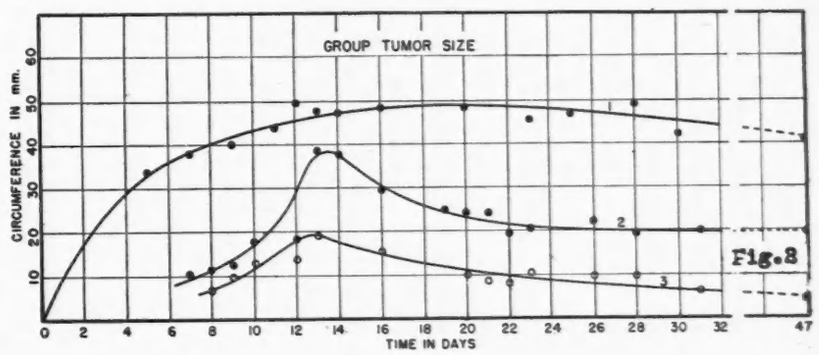
GROUP 3 (0.025 ML. TUMOUR CELL SUSPENSION)

Day	No. of mice in group	No. with tumours	No. without tumours		Average circumference of tumours present (mm.)	Average tumour circumference for group, mm.	Deaths	Remarks
			No.	% of original animals				
0	16	0	16	100	....	....	..	
2	16	0	16	100	....	....	..	
3	16	0	16	100	....	....	..	
5	16	3?	13	81?	....	....	..	
6	16	10	6	81	....	....	..	
7	16	10	6	38	....	....	..	Too small to measure.
8	16	13	3	19	8.4	6.8	..	
9	16	13	3	19	11.6	9.4	..	
10	16	13	3	19	15.4	12.5	..	
12	16	13	3	19	16.7	13.7	1	1 lost.
13	15	10	5	31	29.5	19.0	..	
14	14	9	5	31	37.2	17.5	..	
16	14	7	7	43	30.5	15.2	..	
19	14	6	8	50	36.1	15.4	..	
20	14	5	9	56	34.5	9.9	2	1 regressed. 1 with tumour.
21	12	3	9	62	33.5	8.4	..	
22	12	3	9	62	31.4	7.9	..	
23	12	4	8	56	31.4	10.5	..	
26	12	4	8	56	28.3	9.4	..	
28	12	4	8	56	28.3	9.4	..	
31	12	2	10	70	34.6	5.8	..	
34	11	2	9	70	25.1	4.4	1	Without tumour.
47	10	1	9	70	31.4	3.1	1	With tumour.
51	10	1	9	70	*	....	..	*Not measurable.
54	10	0	10	75	....	....	..	

until a smooth pinkish-white suspension was produced. This suspension was poured through a sterile funnel covered with two layers of cheesecloth as a filter. This removed any fibrous tissue shreds which would tend to plug the syringe later and which would introduce a secondary factor in the reactions induced in the host. The filtered cell suspension was allowed to run into a 10 ml. glass stoppered graduate. The accumulation of cells and tissue shreds on the cheesecloth filter was washed with a sufficient amount of sterile Tyrode solution to bring the cell suspension in the graduate up to the 10 ml. mark.

A tuberculin syringe graduated in 1/100 ml. was used for inoculation purposes with a 27 gauge needle. To ensure a constant equality in the number of cells injected, the cell suspension was kept well dispersed by frequently inverting the glass-stoppered graduate when the groups of animals were being inoculated. The syringe was also inverted several times just before the injection of each animal.





Fifty-four healthy mice consisting of approximately an equal number of males and females of the same age and weight were chosen from stock. These were separated into three groups —Group 1 consisting of 22 animals, received 0.2 ml. of cell suspension, and Groups 2 and 3 consisting of 16 mice each, received 0.05 ml. and 0.025 ml. of tumour cell suspension respectively.

The site of inoculation was kept constant throughout all three groups. The area of choice for inoculation was inside the right groin, under the skin, and into the thigh muscle near its proximal attachments. This site affords a generous blood supply to the implant and ease of measurement by the templet method as the tumour develops.[2]

RESULTS

The results of these experiments are recorded in Tables I, II and III.

Column 1 gives the experimental day; column 2 the number of mice surviving; column 3 the number of animals with tumours; column 4 shows the actual number of animals without tumours and also the percentage of the original number which are without tumours at that date. This includes animals which show complete regressions and those which did not develop tumours. In column 5, the average circumference of the tumours present is given in mm. In column 6, the average tumour circumference for the whole group is given. Decreasing values obviously indicate regressions. Column 7 records the deaths.

The most striking results are: first, the dependence of the number of takes, and secondly the number of regressions on the amount of tumour cells injected. These findings are shown graphically in Fig. 1. In this graph the percentage of mice without tumours is plotted against the time in days.

It will be seen that in Group 1, which received the largest volume of cell suspension, 14 or 64% showed palpable tumours on the second day.

TABLE IV.
(0.0025 ML. TUMOUR CELL SUSPENSION)

Day	No. of mice in group	No. with tumours	No. without tumours		Average circumference of tumours present (mm.)	Average tumour circumference for group, mm.	Deaths	Remarks
			No.	% of original animals				
0	20	0	20	100	....	....	..	
2	20	0	20	100	....	....	..	
5	20	0	20	100	....	....	..	
6	20	2?	18	90?	?	?	..	Not measurable.
7	20	9	11	55	14.6	6.6	..	
9	20	11	9	45	6.8	3.8	..	
10	20	5	15	75	25.1	6.2	..	
12	20	5	15	75	25.1	6.2	..	
13	20	5	15	75	27.6	6.9	..	
14	20	8	12	60	26.5	10.6	..	
16	20	8	12	60	26.5	10.6	..	
20	20	8	12	60	39.3	15.7	..	
23	20	7	13	65	48.0	16.8	..	
25	20	7	13	65	54.6	19.1	..	
27	20	8	12	60	49.8	20.0	..	
30	19	8	11	60	66.7	26.7	1	
38	19	8	11	60	93.0	39.0	..	

The tumours increased until by the fifth day 100% had tumours of measurable size (curve 3).

In the second group, 0.05 ml. of cell suspension, the tumours appeared more slowly, reaching a maximum number of takes on the ninth day (curve 2).

In the third group, 0.025 ml. of cell suspension, the maximum number of takes and the rate of growth at that point were less than in the other groups (curve 1).

Furthermore regressions appeared in the latter group on the thirteenth day, whereas in the first group none appeared until the twenty-third day.

The experiment was carried on until the fifty-fourth day when all the tumour animals in Group 1 had died. The survivals in this group amounting to 18% showed no palpable tumours.

In Group II, one tumour-bearing animal was alive at this date, but died on the following day. Fifty per cent of the original animals of this group were tumour free.

In the group which received 0.025 ml. of the tumours suspension, 75% of the original number were without tumours on the fifty-fourth day. There were no tumour survivals.

An examination of the average tumour size for the groups, column 6 and Fig. 2, indicates that a maximum is reached about the thirteenth day. This means that regression has set in; in other words the animals are developing a resistance to tumour growth. The group which had the large dose showed little change in the group tumour size and, therefore, had developed very little resistance.

These results conform to the accepted mechanism of immunity, the small doses stimulating reticular response, and the larger dose causing a partial block of the reticulo-endothelial system.

This work confirms in part the findings of Urbach and Schnitzler[3] who treated six groups of mice with different dilutions of standard cell suspensions. By dilution of the suspension to 1:250 they obtained a change in the number of takes from 60 to 0%. They conclude, "We must infer from these experiments the possibility of specific active immunization for transplantable mouse tumours".

In an attempt to attain an immunizing dose of Belough sarcoma in our strain of mice, a standard suspension containing 1 gm. of tumour tissue in 10 ml. of Tyrode, was again prepared from a stock tumour-bearing animal. Twenty mice were inoculated with a diluted suspension corresponding to 0.0025 ml. of the original. The results are shown in Table IV. On the ninth day, 11 mice had what appeared to be palpable tumours, but on the tenth to thirteen days only five tumours were apparent. Further takes gradually developed until finally the group became stabilized with 60% of their number tumour free.

The experiment indicates that still another "principle" should be added to those cited above, if reproducable results are to be obtained, *viz.*, the use of the same tumour suspension throughout all experimental groups.

SUMMARY

By using different amounts of tumour cells in the inoculation of mice with Belough sarcoma,

it has been shown that many of the conflicting reports on the effect of specific treatments of neoplasia in animals, can be attributed to a lack of standardization of the tumour inoculum. The number of takes, the number of regressions and the survivals vary with the dosage of inoculum. Therefore, in experiments designed to demonstrate the effect of treatment on tumour bearing animals the trochar and cannula method of tumour transplant should not be used.

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Case Reports

ECTOPIA CORDIS*

By J. P. George, M.D., C.M.

Winnipeg

Ectopia cordis is one of the rarest congenital abnormalities. In it the heart is displaced from its usual position and comes to lie either in the neck (cervical ectopia) or outside the chest (pectoral ectopia), or in the abdomen (abdominal or subthoracic ectopia). Of these varieties the cervical is the rarest; only three cases have been reported in a literature that goes back to 1706. One survived to adult life. The abdominal form is less rare, at least 18 cases have been reported. Of these 5 lived for several years and one, at 36 years, had survived four pregnancies. Most of the cases however, that is 33 out of 53, are of the thoracic type and the children, if living when born, invariably died within a few hours.

The cause of the condition is not known. The heart is sub-pharyngeal until the fifth week of embryonic life and then becomes thoracic. The diaphragm likewise takes its origin high in the cervical region, and, as it descends, the central leaf may be defective, allowing room for the heart to pass through into the abdomen. The sternum is formed from a bilateral series of anlagen, and failure of the lateral components to fuse causes fissura sterni with malposition of the heart. It has been suggested that increased blood pressure results in an overdistended heart which prevents early closure of the sternal bars. In the words of Ignatius de Torres it was "as if the heart, not bearing so close a confinement, burst through the breast and, having broke the sternum, appeared on the outside".

Whatever the cause may be all cases are very similar. Usually pregnancy was uneventful, though often the child was born prematurely. Only once did death occur during delivery. It was a twin labour and the heart of the deformed child ruptured. The sternum is fissured and the pericardial sac is lacking. The heart is covered with parietal pericardium

* Read before the Winnipeg Medical Society, October 20, 1944.

Fig. 1

Fig. 2

which forms a prominent line of junction with the skin. There are always associated abnormalities in the heart, most commonly patent foramen ovale with interventricular septal defects. Extra-cardiac deformities, also, are frequent, if not invariable, the children having singly or in combination hare-lip, cleft palate, club-foot and hernias of various kinds.

Attempts have been made to correct the condition surgically but without success. Martinez in 1706 made a little chest out of pliable osiers and linen which he kept moist with wine and melted butter, but the child died as they all do. In 1925 Cutler attempted to return an abdominally placed heart but failed.

When we consider that ectopia cordis is only one of a number of serious and disfiguring abnormalities, it is, perhaps, just as well that surgery can give no help.

On March 4, 1944, Mrs. S., aged 28, was admitted to Grace Hospital and was confined at 8.13 p.m., two hours after admission. This patient was a multipara having had two normal children, one a female child born in 1939, and a male child born in 1941. Both she and her husband were very healthy people and her pregnancy prior to the birth of this child was quite normal.

It was a normal vertex presentation with no difficulty during delivery. The fetal heart sounds previous to delivery were quite strong; the infant's colour was good and it cried quite lustily as soon as delivered.

On examination the child was found to have an ectopia cordis, hare-lip and cleft palate. The heart was covered with a thin transparent pericardial sac joined to the skin with a definite line of demarcation. Pressure on the heart did not seem to cause much discomfort. The child was quite strong for several hours after birth, but on the second day gradually became weaker and died at 11.15 a.m., March 6, 40 hours after birth.

Photographs taken by Mr. William Doern, x-ray technician, Winnipeg General Hospital. Moving pictures were also taken of the case.

603 Boyd Bldg.

UNUSUAL METASTASIS FROM A PRIMARY HYPERNEPHROMA

By A. Ralph Schrag, M.D. and F. B. Jordan, M.D.

Edmonton

The following case is reported because: (1) two different types of cancer existed in the patient at the same time; (2) there was a metastasis of a hypernephroma to the tongue.

The patient was admitted to one of the Provincial mental institutions in June, 1917, at the age of 34 and was continuously in mental hospital until the time of his death. His mental condition was marked by tactile hallucinations of electricity being played on his body, particularly the area of the stomach. He had many delusions, many of which related to "little red devils in my stomach". In view of these ideas and his general mental condition, it was impossible to obtain any reliable subjective medical history.

On September 16, 1943, the patient suddenly collapsed on the ward and a diagnosis of bleeding gastric ulcer was made from the presence of tar-coloured stools and a small emesis of coffee-ground material. The patient was placed on a routine of morphine sulphate as a sedative and small frequent feedings of milk and cream alternating with generous doses of an aluminum hydroxide emulsion. The following day, because of the very low blood pressure, hæmoglobin and erythrocyte count, the patient was slowly given a small blood transfusion. This was repeated three days later.

The patient made a relatively uneventful recovery and appeared to be free of any sign of hæmorrhage until four months later when he passed two or three tarry stools.

In June, 1944, while carrying out a chest x-ray survey of hospital patients, it was discovered that the patient had two "cannon-ball" areas in the left lung. At this time a tentative diagnosis was made of hypernephroma with metastasis to the lung.

In September, although the patient made no complaint, he was observed rolling his tongue in a peculiar manner and examination revealed a large pedunculated papilloma, roughly spherical in shape and about one inch in diameter. The patient was referred to the

Provincial Cancer Clinic and the tumour was removed. Dr. J. W. Macgregor, Pathologist at the University of Alberta, reported it as being "a metastatic tumour from primary hypernephroma". Dr. Macgregor was able to find only two reports of similar metastases. The diagnosis of hypernephroma was confirmed by an intravenous pyelogram showing a large left kidney with deformed calyces.

The patient died February 10, 1945, and an autopsy was performed. The pathological material was forwarded to the Provincial Laboratory, University of Alberta, for microscopic examination and the following report was received:

"1. Kidney 13 x 10 x 9 cm. greatly distorted due to the presence of a very large tumour mass projecting from one side of the kidney in its whole length. The tumour spreads into the kidney at one pole. Upon section the tumour is composed of variegated yellowish grey tissue flecked with hæmorrhagic areas typical of hypernephroma. Microscopic sections show typical structure of a so-called hypernephroma made up of masses of large clear cells in alveolar arrangement.

2. Lung riddled with spherical firm white tumour nodules 0.5 to 3 cm. in diameter scattered widely through the parenchyma.

3. Portion of tongue. Microscopic sections show subacute inflammatory reaction beneath the mucous membrane but no further tumour was seen.

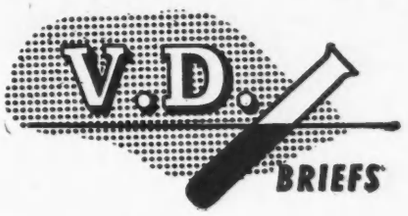
4. Portion of the stomach 10 cm. in diameter (taken from the lesser curvature) showed the presence of a large ulcer 8 cm. in diameter. Microscopic section of the stomach through the large ulcer showed both edges and base of ulcer to be invaded by epithelial tumour cells in atypical glandular arrangement. This tumour is entirely different in its appearance to the tumour of the kidney and that of the tongue previously examined.

Diagnosis.—(1) Hypernephroma—kidney. (2) Adenocarcinoma, ulcerating—stomach."

Provincial Mental Institute.

TRANSMISSION OF INFANTILE PARALYSIS.—"The method of transmission of the virus of poliomyelitis," *The Journal of the American Medical Association* for October 21, 1944, says in answer to a query, "has not yet been clearly demonstrated. . . . The virus has been found consistently in the alimentary tract and stools of both patients and contacts. While a large body of circumstantial evidence supports the theory of direct contact from patient to patient, there is also the fact that the virus has been recovered repeatedly from flies trapped in epidemic areas. However, the importance of the fly as a vector has not yet been clearly demonstrated. It is not possible in the present state of knowledge to say whether the contamination of the fly with virus is a result of a disease or a causal factor in it. The seasonal incidence of . . . epidemics, combined with the finding of virus in the human alimentary tract, stools, sewage and flies, lends weight to the contention that poliomyelitis is primarily an intestinal disease such as typhoid and dysentery. . . ."

Venereal Disease Campaign



Diagnosis of Urethritis in the Male

A diagnosis of gonorrhœa must not be made in the absence of laboratory confirmation. The presence of an urethral discharge and the detection of Gram-negative intracellular diplococci morphologically resembling gonococci in smears of the urethral exudate, establish the diagnosis of gonorrhœa. When specific organisms are not found, a diagnosis of non-specific (non-gonococcal) urethritis is made.

Thinly spread smears of the urethral discharge should be taken as soon as the patient presents himself with an urethral discharge. *Several smears* should be made on the *first examination*, preferably two to four or even more. The larger the number of smears examined, the greater the probability of finding gonococci and the less chance of a case of gonorrhœa being overlooked and diagnosed non-specific urethritis. The first drop of pus, which is nearly always heavily contaminated by other organisms should be carefully wiped from the meatus before the smears are taken.

Suspicion of Syphilis

All patients presenting themselves with symptoms indicating possible gonorrhœa should have a serological test for syphilis.

(*a*) At the time of the initial examination. *The responsibility for this test rests with the physician.*

(*b*) Three months after the completion of treatment. The responsibility for this test rests with the patient himself. This must be clearly explained to him.

Mapharsen Twice a Week

When mapharsen is used for the treatment of early acquired syphilis, it should be given *twice a week*, at least for the first two arsenical courses.

"Find V.D. Contacts — Report V.D. Cases"

Clinical and Laboratory Notes

THE USE OF PLASTICS IN PLASTER CASTS*

By Arthur M. Vineberg, M.D., C.M.,
F. G. Rice and E. C. Brown

The use of plaster of Paris casts in the treatment of fractures was known to the Arabian surgeons at least two thousand years ago. The introduction of crinoline occurred approximately two hundred years ago. Since that time there has been little, if any, advance made in the casting of fractured limbs. With the advent of this war and the Trueta principle of treatment, plaster of Paris has been used more than ever. It is now being used to treat all fractures, large wounds, burns, etc. A very large percentage of cases returned from overseas have been sent back in plaster casts.

One of us (A.M.V.) has been impressed by the tremendous waste of time and energy which the use of plaster of Paris entails, and by the discomfort and restricted mobility of the patients, and for some years he has been looking for a more suitable material. A search of the literature fails to reveal that anything of interest has been done along these lines.

The chief disadvantages of plaster of Paris in the making of surgical casts are that it is time-consuming in application, heavy, bulky and not sufficiently strong. Our objective in this work has been to obtain a substance which will have the following properties: (1) Inert and non-toxic. (2) Quickly and easily applied. (3) Takes initial set within fifteen minutes. (4) Of greater strength per unit weight than plaster of Paris. (5) Easily removed. (6) Sufficiently porous to permit gaseous exchange. (7) No contraction or expansion on setting.

THEORETICAL CONSIDERATIONS

Many different classes of materials have been considered, such as the conventional cements, mortars, adhesives, plasters and like binding media which may be used alone or in combination with a filler to build up a rigid structure. These materials, except for plaster of Paris, were found to be of little use because of their slow-setting properties when applied in anything heavier than a thin layer. Our attention has, therefore, been centred on the group of organic materials commonly designated as "plastics". For our purposes the plastics may be conveniently classified into four groups, depending on the manner in which they are made to take a desired rigid form:

1. *Thermoplastic.*—Materials which may be softened by heat and which become rigid again when cooled.

2. *Thermosetting.*—Materials which are set or cured by heat, an irreversible chemical change taking place so that reheating does not result in resoftening.

3. *Photosetting.*—Materials which may be cured by the action of light rather than heat. Considerable heat is, however, generated in the process.

4. *Soluble.*—Materials which can be dissolved in suitable solvents and which set by precipitation from the solvent or by volatilization of the solvent.

Many materials fall into more than one of the above classifications. In materials of the first three groups, the temperature required or produced in setting is in most cases beyond the limits of human cutaneous endurance and is in all cases dangerous. Furthermore, with thermoplastic and thermosetting materials, fairly high pressures are usually required to make the material take and hold the desired shape. After a brief amount of work with photosetting materials, the plastics which set by the first three mechanisms were discarded.

The soluble plastics appeared to offer the best possibilities. Even within this group many materials had to be rejected because of some undesirable features such as toxicity or contraction on hardening. Finally we were led to the use of water-soluble plastics in conjunction with dehydrating agents.

EXPERIMENTAL

The water-soluble plastics are obtainable in the form of fine powders which may be dissolved in water. On removal of the water they set to hard masses but, except in the case of thin films, the time required is much too long to be practicable. In order to speed up the drying, various dehydrating agents were mixed with the dry powdered plastic prior to the addition of water. In many cases this resulted only in the production of a rubbery mass having no rigidity. However, in the case of plaster of Paris which itself hardens as it takes up water, encouraging results were obtained. Further work on plaster of Paris modified by the addition of water-soluble plastics led to the improved type of surgical cast reported here.

Originally we were seeking a composition which could be applied as a paste directly to the limb or torso, thus avoiding the use of bandages. This was later found to be impractical, due to the difficulty of applying a layer of uniform thickness. Nevertheless, most of the test work referred to here was done

* This work was commenced on the surgical service of Major Arthur Vineberg at the Montreal Military Hospital, Ste. Anne de Bellevue, Que. Technical advice and suggestions were given by Mr. F. G. Rice, Plastics Division, Canadian Industries Limited. Practically all the experimental work has been carried out in the Research and Development Laboratories of Canadian Industries Limited by Mr. E. C. Brown, Mr. I. M. Robinson and Mr. S. E. Ostergaard, under the direction of Dr. I. R. McHaffie.

without incorporating crinoline in the casts. This is in many ways the most convenient way of comparing the relative strengths of cast materials, it being assumed the addition of crinoline will provide the same degree of reinforcement in all cases. However, this assumption is now being verified by a large number of tests on cast materials incorporating bandages.

A comprehensive series of tests was carried out to determine the plastic-plaster mixtures having the greatest strength. The water soluble plastics being tested were mixed in varying proportions with plaster of Paris to form dry powder mixtures. Water was added to the mixed powders to give workable pastes which were cast in the form of strips 5/16" x 13/16" and about 6 inches long. The principle test applied to these strips was one in which a static load was applied midway between two supports under the strip, located 4" apart. The load was slowly increased to the break point.

The most promising results were obtained with mixtures of polyvinyl alcohol and plaster of Paris. For example, a mixture of 10% du Pont elvanol 51A-05 and 90% plaster of Paris, increased the break point to 30-38 pounds from the 22-23 pounds obtained with plaster of Paris.

The new mixture is thus approximately 50% stronger than ordinary plaster, on a volume-for-volume basis. It was also found to be 10% lighter, so that the net gain in strength-weight ratio is better than 50%.

Comparative tests of resistance to impact shock were also made. As a proper impact test machine was not available, quantitative figures could not be obtained but the elvanol-plaster mixture was definitely superior to ordinary plaster.

The incorporation of crinoline in either plaster of Paris or elvanol-plaster mixtures greatly increases the strength and impact resistance. The experimental work at present in progress on this point indicates that the added strength due to the bandage is roughly proportional in both cases.

General Properties of the Elvanol-Plaster Mixture

The elvanol-plaster mixture is a fine, white powder which can be rubbed into crinoline bandages in the same manner as plaster of Paris. It does not contract or expand on setting. The setting time can be varied by slight alterations in the composition and twelve to fifteen minutes is considered most suitable. It is non-toxic and non-irritating. Unlike plaster of Paris, it is not friable so that there is no tendency to chip at the edges and no plaster can work loose to cause irritation. It has a slight elasticity but not sufficient to interfere with good support.

Cost.—The cost of the new mixture is approximately ten cents per pound as compared with about two cents per pound for plaster of Paris. This difference is of little significance.

Clinical Application

Bandages impregnated with the new composition are placed for a few seconds in tepid water and are applied to the part to be fixed in exactly the same manner as is customary with plaster of Paris bandages. The material is smooth-working and easily handled. It can be quickly washed from the hands or gloves. The initial setting time is twelve to fifteen minutes but maximum strength is not attained until it has been well dried, preferably by baking. Removal of the casts with a knife or with shears is easily accomplished.

Four casts have been applied to date, two of which were of the walking variety including the entire lower limb. These casts have stood up well and have given the patients considerable comfort and freedom of movement due to their lightness. One of our patients, with a compound fracture of the tibia and fibula nine months' old, was able to walk for the first time because of the lightness of his new cast. A cast 1/8 to 1/4 inch thick is sufficient.

Casts of the new material are not resistant to a thorough wetting with water. This may be an advantage in some cases where it is desirable to remove a cast by soaking and unwinding. However it is generally considered to be a disadvantage. Work is at present in progress on a method of water-proofing without destroying the porosity. The results are promising.

Summary

A new mixture of a water-soluble plastic and plaster of Paris for the making of surgical casts has been developed. This mixture is in the form of a white powder and can be used in the same manner as plaster of Paris. It has the following properties: (1) About 50% stronger than plaster of Paris. (2) About 10% lighter than plaster of Paris. (3) No contraction or expansion on setting. (4) Setting time 12 to 15 minutes. (5) Non-toxic and non-irritating. (6) Not friable. (7) Somewhat more elastic than plaster of Paris. (8) Porous. (9) Cost about 10 cents per pound versus about 2 cents per pound for plaster of Paris.

Clinical trials to date have been most encouraging.

We wish to express our appreciation for the co-operation of the Army-Medical Research Committee.

Editorial

HOSPITALIZATION COSTS

NO one aspect of a scheme for improving health service should be emphasized by itself. As regards hospitalization, however, it is worth drawing special attention to the costs which must be expected. The Department of Hospital Service of our Association has taken particular pains to assemble these figures, and they may be taken as authentic and exhaustive.

It is first assumed that *adequate* hospitalization is intended; this includes active general hospitals; chronic hospitals; convalescent hospitals; and special hospitals, such as tuberculosis, mental and infectious disease institutions. A hospital, however, implies a large and varied staff, with provision for satisfactory diagnostic services; there must be provision for cost of building or enlarging; there must be provision for operating costs; and in the smallest, most remote hospitals there may be need for special arrangements such as travelling diagnostic clinics, aerial ambulances, etc.

Before dealing with the cost of adequate hospital accommodation, it may be pointed out that at present the accommodation is notably inadequate. In no type of hospital in Canada are there sufficient beds for the needs of the community. This is probably most serious in the case of beds for chronically ill and convalescent patients and the needs of these two types should be definitely separated. The gap between what is felt to be adequate and what actually exists is very wide indeed, and the need is expected to increase as time goes on. It is stated that the total number of beds at present in Canada, in all types of hospitals, is 101,566, but the estimated total present need is 143,260, and it is felt that in ten years' time the need will be 161,060.

Now what are the costs. At present, we are told, hospital consultants are very cautious over any specific estimates of the cost of construction, or even maintenance, in the immediate future, but the tendency is mainly upwards. In the larger hospitals with standards of construction continually rising, the costs are certainly going to be higher. Figures of $8,000.00 to $10,000.00 per bed are mentioned instead of the present figure of about $5,000.00 per bed.

From this, the estimated cost of new hospital construction is as follows:

	Immediate expenditure	*Additional within 10 years*	*Total*
Active...	$ 46,955,000	$55,000,000	$101,955,000
Other....	129,212,000	31,200,000	160,412,000
	Grand total.....		$262,367,000

This does not include operating costs. Here again the costs are rising sharply; indeed they are not accurately known. Only one Province has made a close study of the subject, and it finds many variations. The average per diem cost of operation for 111 hospitals in this particular Province in 1944 was $4.42 per patient daily, and certain large public institutions had operating costs as high as $6.25 per patient per day. "Frills and private features" were extra. The costs for chronic, convalescent, mental and tuberculosis hospitals are considerably lower than this but taken together they form a large part of the total.

In summary, the operating costs for all present hospital needs are conservatively estimated at $115,951,000, not including the cost of hospitalizing war veterans under the D.V.A.

Now these are facts which cannot be escaped. They are put forward, however, not so much in their relation to hospital problems, as to the question of government directed health services. We have never been satisfied that the legislative proposals in this direction have made enough allowance for the costs. We may hope that figures such as have been collected by our Hospital Service Department will be given the consideration they deserve. They form only a part of the whole picture of the cost of medical care.

Integrity without knowledge is weak and useless. . . .
Knowledge without integrity is dangerous and dreadful.
—Samuel Johnson.

Medical Economics

THE RÔLE OF PUBLIC HEALTH IN THE PRACTICE OF MEDICINE*

By R. P. Vivian, M.D.

Minister of Health, Province of Ontario, Toronto

My usual occupation is that of a general practitioner, in a small Ontario town of some 5,000 people, Port Hope. By grace of the electorate, I find myself Minister of Health for the Province of Ontario. As such, I am charged with the responsibility for the administration of a large Department, containing over 3,400 people, and with an annual budget of approximately 12 million dollars. It is my duty to assist in the development of a policy for the Department. This policy affects, directly and indirectly, the health and well-being of nearly four million people.

The activities of the Department are varied. The foremost place is given to development of the aspects of hygiene and preventive medicine. In addition, however, the Department is of necessity responsible for certain services in the treatment field, such as hospital care for the mentally ill. The remaining activities range from the supervision of cemeteries to the provision of diagnostic laboratory services, and have recently included the subject of general hospitalization and prepaid medical care.

For peculiar reasons, the subject of public health has been considered extremely dull by the medical profession. I find it a little difficult to understand this. Recognition of the importance of public health services has been clearly demonstrated, by Provincial Governments, in the enactment of some of their earliest legislation. Some of the most spectacular advances in medicine have come from this field, and at the present time an aroused general public is demanding that procedures be adopted for an improvement in the state of health of *all* our people.

With this situation prevailing, I am of the firm opinion that it is high time that we in the medical profession should give the fullest consideration to the existing conditions and provide the leadership in our own particular field that is expected by the general public.

Speaking, therefore, as a general practitioner and as a member of government with some knowledge of the political situation, I wish to outline what I believe to be the rôle of public health in the practice of medicine.

By public health I mean a service for the prevention of illness and the safeguarding of good health, by positive action in the fields of hygiene and preventive medicine, through established agencies of government and paid for by taxation. In Upper Canada, the first public health service was begun as a result of plague in Europe, with the passing of the Quarantine Act of 1794. This Act forbade the disembarkation of passengers or crew until the individual had successfully passed a medical examination by an appointed physician, who was paid from tax-collected funds. This was an undertaking by government on behalf of the people as a whole.

In 1867, Confederation brought about Provincial administration and its association with local municipal government. The importance of public health was recognized by the fact that some of the earliest legislation enacted by the Provinces was the passing of their Public Health Acts, as, for example, Ontario 1873, Nova Scotia and New Brunswick at the same time, Manitoba 1879, British Columbia 1885, Quebec and Prince Edward Island at the same time in 1886, Alberta in 1906, and Saskatchewan in 1907.

The machinery was thus created by which a program could be developed within a local community through Provincial assistance. The original public health Acts arbitrarily set the responsibility for public health administration within the municipality. The responsibilities of the Provincial authority were purely consultative. With the gradual expansion of public health legislation in Canada there has been a gradual extension of Provincial interest but there is still left certain responsibility to the local authority. Federal participation is of recent origin and has been limited mainly to some financial assistance for defined purposes and to an attempt to provide some coordination of services.

It is not my purpose today to go into the detail of the complexity of public health administration. I must, however, point out two things: firstly, the early interest and continued recognition by the government of this important field as a duty to the people; and, secondly, the present method in vogue for community administration. In recent years the public generally has become more conscious of the deficiencies in the state of our national health. The rising tide of mental illness, defective vision, defective teeth, malnutrition, and the examples of general sub-standard physical development, as shown by the examinations conducted for the armed forces, have all created a demand that our state of health be improved. It is natural, therefore, that the people should look to government to undertake a needed and desired program in this regard. Positive improvement cannot be brought about solely by the medical treatment of illness. It can be achieved through a system

* Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Montreal, P.Q., June 14, 1945.

of public health, properly co-ordinated with other medical practice. That is the objective.

As a way in which this can be achieved, I must draw your attention to the present method of community administration of public health services.. Originally, the frequently wide separation of communities made it obligatory that these services be provided locally by the part-time assistance of general medical practitioners. Increase in population and better methods of communication have not only increased some of the hazards to good health but they have made it possible to improve local administration. In many communities it was not possible to create a good type of preventive service on a part-time basis by general practitioners. A specialist service in hygiene was required. To provide such a service at a reasonable cost, persons with special training are employed, on a full-time basis, to devote part of their time to each municipality within a county, or to each area within a metropolitan unit. This development of the larger administrative unit through county or metropolitan, rather than local, boards of health has been greatly assisted by the International Health Service of the Rockefeller Foundation.

For the safeguarding and improvement of health, we have, therefore, the precedent of early and sustained interest by government and the development of suitable local and Provincial administrative machinery. Now we have popular demand. How are we going to satisfy it? In my opinion, it will be necessary to complete the machinery by having co-ordination among the three levels of government, Federal, Provincial, and Municipal, and a clear allocation of the responsibilities of each, together with satisfactory financial arrangements to meet the cost. This, however, is more a political than a medical problem. I am hoping that it may be solved in the near future. From a physician's standpoint, I am more interested in the development and carrying out of a suitable program.

A great deal has been accomplished in the past. The earliest interest in public health was related to the potential hazards in physical environment. Popular belief in the dangers of miasmas, graveyards, night air, and stagnant water led to the development of a program based upon scientific knowledge and the practical application of such. It is interesting to note that in the Province of Ontario the death rate from typhoid fever in 1906 was 37.8 per 100,000 in comparison with the 1943 figures giving a death rate of 1.0 per 100,000. In the same year, the death rate from tuberculosis was 123.7 per 100,000 compared with the figures of 1943 giving a rate of 28.8. Using figures from the same year, 1906, the death rate for diphtheria was 10.2 per 100,000. In 1943, the rate is given as 0.2.

Perhaps one of the greatest advances has been made in the field of maternal and infant hygiene. In the year 1906, 132 infants died out of every thousand born alive, an astounding percentage of 13.2. In the year 1943, only 42 infants died out of each thousand born alive, a percentage of 4.2.

These are merely examples of what has been accomplished in the public health field in the past. The need for further improvements is still great. Of this there can be no doubt. There must be a continuous and sustained effort with regard to the fields in which advances have already been made; for example, the relaxing of the diphtheria control program in the City of Toronto, which had three cases reported and no deaths in the year 1940 resulted in there being 20 reported cases and 4 deaths in 1944. Further efforts can reduce the existing rates for tuberculosis and V.D.

There must be, in addition, an exploration of fields as yet only partially touched. As an example, a partial survey of elementary school children, in an average Ontario county, showed that 65% of the children had defects of some kind or another, worthy of medical recognition, that were not receiving the attention of either school authorities or parents.

There are many other problems, the solution of which might be aided by public health services. I refer specifically to the advances that must be made in the field of mental hygiene. There is needed a psychological service, integrated with general medical supervision of the school-age group, and possibly adaptation of the same principle for other groups within the community. There should also be a greater effort to co-ordinate the advances in psychiatry with general medical practice, and further study must be made of the great problem of eugenics.

Food is one of the primary requirements for the well-being of mankind. During the past few years the science of nutrition has made rapid progress. There is a considerable increase in the knowledge being accumulated on this subject. There is, however, no definite and precise measurement of quantitative nutritional requirements. It is important from the standpoint of health that greater attention be paid, not only to the science of nutrition, but to the application of this knowledge to the individual in his community in terms of food. Housing is another important subject that should receive due consideration.

Other very important matters, which do not fall strictly within the field of a public health service, are in need of early attention. I am thinking particularly of rheumatism, with its attendant cardiovascular problems, and of cancer, the second highest cause of death in

Canada at the present time. These are subjects which need to be carefully considered, so that definite improvements can be achieved by those engaged in the fields of both prevention and treatment.

Of the way in which all these things can be done there should be no doubt. The individualistic character of our people, the undoubted ability of the medical profession in Canada, and the popular demand for the maintenance of the patient-doctor relationship must forbid our embarkation upon a course of state medicine in its true meaning. I can think of nothing more disastrous for the good health of our people. The political poppycock of so-called socialized health services has had an immediate and definite answer. Some form of sickness insurance or prepaid medical care for all classes and groups is desirable. Flexibility in a national program may achieve this desirable end, but sickness insurance can really accomplish only three things: a distribution of the financial burden of the individual cost; the opportunity for isolated communities to obtain medical care on a subsidized basis; and the possible improvement of the financial security of the individual physician.

The Oxford dictionary defines medicine as, "the science and art concerned with cure, alleviation, and prevention of disease and with restoration and preservation of health". That is what we attempt to practise, but have we, as physicians, demanded that the basic requirements for good health be provided in a suitable way? The Canadian medical profession would probably resent the title of "Saints in Service", and neither would they enjoy the implication of being "Merchants in Misery". We as physicians must provide leadership. The improvement of the health of the people of Canada can only come through the complete understanding, co-operation, and active participation in a national, but co-ordinated, system of public health, which reaches into every community. How can this be done?

The rôle of public health in the practice of medicine must be clearly defined and carried out. It has made important contributions in the past and can make even more important ones in the future. It is the duty of government to provide public health services. They may assist in the provision of sickness insurance, but there should be a clear distinction made between these two component parts of health insurance. It is necessary to have financial, and possibly administrative, aid from government for the profession to carry out a suitable plan for sickness insurance. It is equally important that the profession aid government in carrying out public health services. There must be, in addition, a closer combination of effort in solving the problems that would seem to fall in the borderline area between the preventive and the treatment services.

Irrespective of what may develop in the way of sickness insurance, the public health service must be one which benefits the individual in his own locality. I wish to point out clearly that the prevention of disease and the safeguarding of good health in the community are direct responsibilities of the local public health authority. One way to do this is by a basic community service, involving five major points: public health education; prevention of acute and chronic communicable disease; provision of adequate sanitation and the safeguarding of food; additional interest in maternal and infant hygiene; and the development of a school child program. Such a service should be financed by funds secured from local taxation, with Provincial subsidy and federal assistance, and administered by qualified and competent specialists in their own fields, with the aid and co-operation of the general practitioner and specialists in treatment. This service within a community must be supplemented from the Provincial Departments, with consultation in all aspects of the community program and with specific reference to mental hygiene, sanitary engineering, industrial health services, and the provision of laboratory aid.

The true rôle of a public health service is to undertake those aspects of hygiene and preventive medicine beyond the scope of the general medical practitioner and to utilize the services of the general practitioner within the preventive program.

Good government is dependent upon the presence of good authoritative voluntary agencies. The public health service has been greatly assisted by the parts so nobly played by voluntary nursing organizations, such as, the St. Elizabeth and the Victorian Order of Nurses, as well as the Red Cross and the Associations of Tuberculosis Sanatoria throughout Canada. Further co-ordination of their assistance in the public health field is required. Their task, and it is a most useful one, is to assist the official public health agencies. It is the task of the public health group to assess the problems and needs of the areas, to outline the educational campaign, and to promote a satisfactory control program. The rôle of the voluntary agency is to help in carrying out such a program by interpreting to the community what is actually contemplated, to undertake its definitely allocated portion of the plan, and to lend assistance by stimulating public support on a wider basis than is possible for any public health authority.

The way in which the improvements can be made will, of course, vary from Province to Province, depending upon their own particular problems, but one of the basic requirements for a continuation of progress is not only the full

co-operation of the present generation of medical men but the continuing effort by those who will graduate with a better knowledge of the fields of hygiene and preventive medicine. This necessitates an improved undergraduate and postgraduate training in the field of public health. Inasmuch as many of the problems with which we as medical men are faced are of a social nature, related to the structure and composition of groups of our people, there should also be a better training for the undergraduate in the problem of social welfare. There is, in addition, a further need which should be met. The technical advances in medicine have been great. Frequently, however, it has taken a long time for these advances to reach and benefit the various phases of community life. More attention should be given to research to benefit the commoner, but none the less important, every day medico-social problems.

It is my hope that the practice of medicine, as truly defined, might be benefited by the establishment of a department, within our medical schools, to give further attention to the ordinary problems, to act as a catalyst in providing new solutions, and to seek a better way to bring the scientific advances of medicine more quickly, and perhaps more effectively, to the individual in his own community or group. The name of such a department is not really important, but it should be one that defines what it is trying to do. It might utilize the term medicine, in its strict meaning, and have added to it the adjective "social", in the meaning of society and its strata and its problems. Departments of social medicine by any name would seem to be a requirement in the further advance of medical teaching. They might serve to keep the balance between government endeavour and private enterprise, and they could be very useful in aiding general medical practice.

To summarize, we have in Canada a public health service recognized as a responsibility of government, a service which will be continued and augmented for the prevention of illness and the safeguarding of good health. Important contributions have been made in the past. The need for further advances is great. This can be achieved by clearly defining the rôle of public health in the practice of medicine. The success of this will depend upon the medical profession giving leadership for the people of Canada.

The Wagner-Murray-Dingell Bill

[*We republish the following material from the "Journal of the American Medical Association" as an interesting commentary on the political and medical points of view regarding health insurance in the United States.*—EDITOR.]

The Journal of the American Medical Association of June 30 publishes a letter from U.S. Senator Robert F. Wagner, together with comments by the editor, relative to the proposed Wagner-Murray-Dingell bill, which would expand the Social Security Act to include a vast program of medical care and hospitalization insurance. Senator Wagner's letter, addressed to Editor Morris Fishbein, M.D., is in reply to an editorial which appeared in the Journal on June 2.

"In the last paragraph of your editorial," Senator Wagner said, "it is stated that I have 'not consulted with the American Medical Association.' The fact is that I *did* consult the American Medical Association. On December 7, 1944, I addressed a letter to Dr. Olin West, Secretary and General Manager of the American Medical Association, listing a series of suggestions for the revision of the 1943 bill and inviting the Association to comment on these proposals."

In a reply addressed to the editor, Dr. West explained:

"I informed Mr. Wagner that I did not feel that I was in a position to enter into a discussion 'of the proposals for changing and broadening the health provisions of the Wagner-Murray-Dingell bill,' since any comment that I might be disposed to offer would be purely in the nature of personal opinion. I stated that the House of Delegates of the American Medical Association is its policy making body and that only the House of Delegates is in a position to commit the American Medical Association with respect to legislation of such great importance to the public and to the medical profession as the Wagner-Murray-Dingell bill. I informed Mr. Wagner that a copy of his letter addressed to me had been sent to the elected officers of the Association. . . . It did not occur to me that Mr. Wagner intended that his letter should be considered as a request for a statement representing the policy of the American Medical Association, and even had I believed his letter to be of that nature, I should not have presumed to speak for the Association. The letter merely asked for comments on certain proposals; it did not suggest or invite a conference."

Continuing, Senator Wagner's letter said in part:

"On numerous occasions over the past 10 years the American Medical Association has been urged to put forward constructive proposals to deal with admitted needs for health and medical services in the United States . . .

and the Association has condemned every proposal which had a chance to deal with our large national needs on an adequate basis."

Replying to this portion of the Senator's letter, Dr. Fishbein said:

"Senator Wagner and the representatves of the Social Security Board have queer ideas of consultation and co-operation. From the first they have insisted on federal compulsory sickness insurance as the only answer to the problem of medical care. They refuse to listen to any other proposals or to modify in any way the proposals developed through the Social Security Board and introduced by the Senator."

In another portion of his letter, Senator Wagner emphasizes that the bill specifically provides that an unemployed worker is disqualified from receiving his benefits if he refuses to accept suitable employment. "You also repeat the error," the Senator's letter said, "that 'the old age benefits in some instances would pay a man more for retiring than for continuing at his job.' The fact is that our bill includes the 80% maximum contained in the present law, and that a man cannot receive as much on retiring as he has ordinarily earned in covered employment."

To this, the editor of the Journal replied:

"Expert economists and accountants are having difficulty in interpreting the Senator's estimates and his tables. In the *Congressional Record,* May 28, 1945, page 530, he himself introduced some corrections of errors in his tables. Practically all authorities are convinced that the sums to be spent under this bill are far beyond the 8% tax on the payroll that the bill proposes. This the Senator freely admits, stating that the total amount will be made up from general taxes. Referring specifically to Senator Wagner's comments . . . is it not the maximum government control over the individual to suggest that a worker will not be entitled to his benefits under unemployment insurance unless he takes a job that a federal government agency offers him? Will the workers of this country be willing to accept that type of dictation?"

In closing, Senator Wagner commented on the last sentence of the Journal's editorial. "You refer," he said, "to 'obstinacy' typical of the manner in which my colleagues and I have tried 'to impose their notions regarding the care of the public health and the sick on the people of the United States.' . . . It is evident from the results of numerous polls and from the many thousands of letters written to me and to my colleagues that the American public is in favour of health insurance. I feel that the American Medical Association has the opportunity to render a great public service in this field. I hope that instead of pursuing a negative policy you will join with those of us who are trying to find constructive solutions to one of America's basic problems."

Dr. Fishbein, pointing to the work which has already been carried out by the American Medical Association on voluntary health insurance proposals, replied that "various state and county medical associations are now participating in trials of various techniques with the hope that suitable methods can be found," and added: "This is the very opposite of obstinacy. Senator Wagner and the Social Security Board, however, have never admitted any possible answer to the problem of medical care except a federal compulsory sickness insurance system. This is the apotheosis of stubbornness and obstinacy and with it a complete lack of willingness to confer, to consult or to reason."

Men and Books

AORTIC STENOSIS AND INSUFFICIENCY AND ANGINA PECTORIS*

(The First Clinico-Pathological Case Report)

By Harold N. Segall, M.D., F.A.C.P.

Montreal

When William Heberden first described the syndrome which he named angina pectoris,[10] he had seen some twenty cases, but had not yet studied a single case postmortem. In his dissertation entitled, "Some Account of A Disorder of the Breast" presented to the College of Physicians of London on July 21, 1768, he did not describe the story of any individual patient, but presented the clinical syndrome as a whole. Its publication in the *Medical Transactions* of the College of Physicians in 1772 appears to have initiated considerable interest in the subject, so that on April 16, 1772, about three months later, an anonymous physician wrote to Heberden,[11] describing his own symptoms which were those of angina pectoris. Moreover, this noble man closed the letter with the following sentence: "But, be the cause what it may, if it please God to take me away suddenly, I have left directions in my will to send an account of my death to you with permission for you to order such examination of my body as will show the cause of it; and, perhaps tend at the same time to a discovery of the origin of that disorder, which is the subject of this letter, and be productive of means to counteract and remove it." Heberden published this letter together with the subsequent story of the anonymous physician's death and autopsy in the third volume of the *Medical Transactions of the College of Physicians* (1785). This constitutes the first clinico-

* Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Section of Historical Medicine, June 13, 1945.

pathological report of a single case of angina pectoris.

About a month after this first postmortem study in a case of angina pectoris, Heberden received a letter from Dr. John Wall of Worcester, dated May 30, 1772,[14] which contains the first clinico-pathological report of a case of angina pectoris in which the autopsy revealed aortic valve calcification with stenosis and insufficiency, and it is this letter which forms the subject of the present communication. Both the story of the anonymous physician and the letter from Dr. John Wall were read by Heberden at a meeting of the College of Physicians on November 17, 1772. John Hunter had performed the autopsy in the case of the anonymous physician and found no evidence of disease which could account for the symptoms or the sudden death. Heberden offers some reasonable remarks concerning the significance of the negative evidence and leaves the question of the cause of angina pectoris as unknown. Dr. Wall's letter is published without any comments from Heberden, and reads as follows:

Worcester, May 30, 1772.

"A few days ago, I was permitted to inspect the body of a person who died of the disorder which you have described in No. vi, Vol. II. of the *Medical Transactions*, and named the angina pectoris. As this is the only opportunity I have ever had of enquiring into the cause of that complaint; and as you yourself acknowledge that you never saw any one opened, who had died of this disease, I hope the following account, imperfect as it is, will not be entirely unacceptable to you or the College.

"To the description you have given of the disease, I have nothing to add; and shall therefore only beg leave to observe, that in most, if not all, the persons whom I have attended in it, the pain under the sternum constantly extended itself on each side across the breast in the direction of the pectoral muscle, and affected one, or commonly both arms, exactly in the place where the muscle is inserted into the os humeri. You mention this symptom only cursorily; but I have found it to be so general, that I have been induced to place it amongst the principal diagnostics. I have seen 12 or 13 persons afflicted in this manner, of which number one, who applied early in the disease, was relieved considerably by the use of antimonial medicines joined with the fœtid gums. He is still living; and goes about with tolerable ease. Two were carried off by other disorders; all the rest died suddenly.

"The person, who is the subject of this paper, was a short, but well-made man, inclined to be fat; a circumstance which you have taken notice of. He was 66 years of age when he died, and had been afflicted with these complaints 6 or 7 years. In the former part of his life, he had had several very severe attacks of the rheumatism; and therefore this pectoral muscle appearing to be so particularly affected, this disease at its first seizure, and for a considerable time afterwards, passed under the same name; and therefore was not much attended to.* At first, for two or three years, he only felt a slight pain and tightness across his breast and arms, upon walking a little faster than ordinary. By slow and very imperceptible degrees, this increased; till at last it affected him so much, that he could not walk but in a very slow pace, and with great difficulty; he could not go up stairs, nor lie down, nor get up out of his bed, without bringing on a violent dyspnœa, or rather a sense of suffocation; and if he strained for a stool, the capacity of the thorax being then straitened by the compression of the abdominal muscles, and retention of the breath, he was almost ready to expire: so that the medicines which relieved him most were such as kept his body very open; and these gave him ease, not so much by the evacuation, as making the fæces come away with more facility. He was always better for a day or two after bleeding. He was always free from any cough till towards the latter end of his illness; and then a very troublesome one came on, attended with a hoarseness; and he then expectorated a thin frothy phlegm, sometimes a little tinged with blood, and towards the end mixt with some matter of a purulent appearance. His pulse was never irregular, but always small; and during the paroxysms, it sunk so much under the finger, that it could hardly be felt. He died after having struggled in the fit about two hours.

"Upon attempting to open the thorax, the cartilages of the ribs were found so much indurated, that it was exceedingly difficult to divide them by the knife. This ossification was most remarkable in the sixth rib on each side, but was much the strongest on the left: being there full as hard as the bone itself. Upon raising the sternum, the surface of the pericardium for a large extent was covered with fat, nearly an inch in thickness. The lungs were greatly distended with very black blood, they were full and hard; and in the cavity of the thorax was a very considerable quantity of an aqueous fluid.

"Upon cutting into the lungs, a frothy mucus, mixt with something purulent and of a fœtid smell, issued from every part, but principally from the divided bronchia: this matter was more in quantity from the left lobe; but no cavity, ulcer, or abscess, was observed anywhere. Upon opening the pericardium, the heart appeared of an uncommon size, and was covered with a great quantity of fat; the pericardium contained no less than a pint of fluid. Upon examining the heart, no part appeared diseased, till we opened the left ventricle; and there, the semilunar valves, placed at the origin of the aorta, were found to be perfectly ossified. They did not, as usual, lie flat upon the divided orifice of the vessel; but stood erect, and appeared to be immoveable. They were entirely osseous through their whole substance; but the ossification was formed unevenly, and as it were in spines, some parts being near a line in thickness, and others thin like a connecting membrane, but perfectly boney. The aorta was at its curvature considerably enlarged; and for near an inch from the heart, was in part ossified; there being several boney scales or laminæ in it, but not connected with one another.

"In considering the morbid appearances discovered by dissections, it is necessary to distinguish accurately the cause from the effects; otherwise we shall form a wrong idea of the disease, and reason injudiciously. Thus in the present case, though the pressure on the heart and lungs, from an extraordinary quantity of fat, a large effusion of liquids into the cavity of the thorax, and within the pericardium, and a vast accumulation of blood in the substance of the lungs themselves, must necessarily have much impeded the transmission of blood through those parts, and thereby have occasioned dyspnœa, etc.; yet these, though they greatly aggravated the symptoms, were by no means the cause of the disease. The origin of this disorder is here evidently to be traced from the induration of the semilunar valves; which existed, probably, in a less degree for several years, and increased gradually till it came to a boney hardness and immobility. From the instant this rigidity in the valves first began, the circulation through the heart, and consequently through the lungs, was in some

*"This circumstance has usually made both the patients themselves, and those who attended them, imagine the complaint to be merely muscular; and accordingly it has been named gouty, rheumatic, or scorbutic: but they could hardly have been so deceived, had they considered, that in the present case the pain is very deep seated below the sternum."

degree impeded: but when at last they became so much indurated as to be hardly moveable, the blood must have been propelled into the aorta with great difficulty; and probably part of it regurgitated again into the ventricle during the systole of the artery. By this obstacle to the circulation, the heart and lungs were loaded and distended to the utmost stretch; and by this distension, when it arrived at a certain point, the serous parts of the blood were squeezed out through the coats of the vessels, and an hydrops pectoris et pericardii was brought on. Though this effusion of fluids must have very much straitened the capacity of the thorax, and caused an additional pressure on the heart, yet cannot the symptoms of the disease, with propriety, be deduced from hence; since the sense of suffocation on motion, etc., probably existed long before any such effusion came on; nor would the patient have been much relieved, or for any length of time, could that extravasated serum have been let out by any operation.

"It is possible, that this induration of the semilunar valves may not be always the cause of this disease; though it seems not improbable, that some malformation in the heart or vessels, immediately proceeding from it, may be so. Indeed, when we consider how frequently such indurations in the valves of the heart have been found;* that the disease in question does not come on till a person is advanced in years, and consequently till a rigidity in every part naturally comes on; we shall, I think be inclined to imagine, that a præternatural induration of the parts necessary to the circulation through the heart, may be the predisponent, if not the efficient cause of this disorder.

"In most of Morgagni's observations, when he found the valves of the heart indurated or ossified, there is no satisfactory account of the symptoms which the patient had laboured under; on which account, the observations are not of the use they otherwise would have been. However, I have met with one case,[1] which is so much to our purpose, that I cannot help making some extracts from it. It is in his 23 Epist. Art. 8, 9.†

" 'A woman, a little younger than that last described, complained, in the same hospital of a palpitation of the heart sometimes, but always of a difficulty in her breath, which she could not draw but with the neck erect; and still more of so great straightness and anxiety at her heart, that very often she seemed just at the point of death. Some supposed her to labour under a dropsy of the pericardium. Her pulse never was intermitting. . . . but there was no dropsy of the pericardium. The valves of the aorta were indurated and one of them even bony. The trunk of the artery itself shewed, up and down on its internal surface, either something bony, or something verging to the nature of bone. . . . Wherefore, in the woman also spoken of by me, besides the aorta being here and there bony or inclining to a bony state, the valves of it are also to be attended to. For, as one of these was bony, and the others indurated, so being, of consequence less yielding to the blood, they might increase the obstacles to its exit and, on the other hand, not sufficiently prevent its return when, soon after, repulsed by the contraction of the great artery; so that, as some portion of it returned into the left ventricle of the heart, when this ventricle ought to receive the blood that was coming in from the lungs which circumstance finally could not but overload both the lungs and the heart.'

"It may be difficult to account satisfactorily for the symptom above taken notice of, where the pectoral muscle is so particularly affected: but this appears to be merely spasmodic, and to arise from an irritation on the nerves of the thorax and heart.* Perhaps it may throw some light on this affair, to consider that the nervi intercostales, or sympathetici, distribute many branches to the heart, arteria pulmonalis, and aorta; the other branches of the same nerves surround the subclavian arteries and veins, and communicate with the cervicales, which latter terminate at the insertion of the deltoid muscle into the os humeri, which is precisely the place affected by the spasm already mentioned.†

"I am, Sir, etc., J. WALL."

Perhaps Dr. John Wall did know that Theophile Bonet[4] had included the description of a case of sudden death in which the autopsy revealed an ossified aortic valve in his *Sepulchretum, sive Anatomia Practica* (1679), but as he deplored the meagreness of the clinical data offered by Morgagni, it is not surprising that he omitted to mention Bonet's case which, as far as can be traced at present, is the first description of sudden death associated with calcification of the aortic valve. Bonet had not seen the case during life, nor was he present at the autopsy. He had received a piece of the aortic valve as a gift, apparently from a confrère. The case was that of a Parisian tailor who fell to the ground on the street and died. At autopsy "no disease was found anywhere except that the three semilunar cusps, situated at the origin of the aorta from the left ventricle, were discovered to be bony". The fact that Dr. John Wall diagnosed angina pectoris only a few months after the appearance of Heberden's publication and interpreted the aortic valve lesion as the cause of the symptoms marks his contribution as the first of its kind. In the course of these past 173 years, various causes of cardiac pain have been clearly defined and aortic valvular disease has become established as a pathological entity that is closely related to cardiac pain and sudden death. This represents an advance in knowledge based on statistical data. The mechanism of cardiac pain and the cause of sudden death in cases of aortic valvular disease is, however, not much clearer now than it was in Wall's time. Indeed, he very wisely suggested that the nervous system had much to do with the pathological physiology in such cases. At present we too invoke reflex mechanisms to explain the symptoms and the phenomenon of sudden death in cases of severe aortic valve disease.

The reference to "several very severe attacks of rheumatism" in the case of Dr. Wall's patient and especially as they occurred "in the former part of his life" permits the assumption that the aortic valve lesion was rheumatic in etiology and, therefore, the mechanical disturbance was chiefly that of stenosis. Wall's discussion of the disturbance in function due to the

* Vid. Morgagni de Causis & Sed. Morbor. Epist. 9. Art. 19. Epist. 23. Art. 8. Epist. 37. Art. 30. Epist. 48. Art. 38. and in many other places."

† Wall quotes Morgagni in Latin. This translation is from the work by Benjamin Alexander.

* "Morgagni observes, Epist. 4. Art. 22. that in a certain divine, who used to point to his sternum as the seat of his pain, this symptom proceeded from a disease in the great aorta, which lies deep in the breast under the bone."

† See Winslow's Anatomy.

bony state of the aortic valves implies this and also that there was probably some insufficiency. In his day the terms "stenosis" and "insufficiency" had not yet gained currency in medical language, but in the following phrases he describes these concepts very clearly: "But when at last they (aortic valve cusps) became so much indurated as to be hardly movable, the blood must have been propelled into the aorta with great difficulty and probably part of it regurgitated again into the ventricle during the systole of the artery." In 1772 there was no reason why Dr. Wall should mention the coronary arteries specifically in a case of angina pectoris, but it is to be regretted that he did not add a sentence to state the condition of these arteries in his case; for today we cannot ignore the possibility that the patient might also have had arteriosclerosis with marked narrowing or occlusion of coronary arteries. Assuming, however, that the coronary arteries were examined and their condition was not mentioned because they presented no significant abnormalities, we may accept this case as the first in which a clinical diagnosis of angina pectoris was made and severe aortic valvular disease was found at autopsy as the main cause of the symptoms and of the patient's death.

Perhaps Dr. Wall was not sufficiently interested in the history of medicine to be familiar with some of the older English literature; but his reference to Morgagni indicates that he did read current literature, for the date of Morgagni's publication is 1761, only eleven years before Wall wrote his letter to Heberden. The London surgeon, William Cowper,[7] was the first to describe cases of aortic insufficiency in a paper entitled, "Ossification or Petrifactions in the Coats of the Arteries, particularly in the Valves of the Great Artery", contributed to the *Philosophical Transactions of the Royal Society* (1706). He describes both the pathological lesions and clinical symptoms in three cases. "Extraordinary shortness of breath and pain about the heart" are mentioned in the case of a man who was about forty years of age. These three cases were even more appropriate to Dr. Wall's discussion than that of Morgagni, and Wall did not have far to look in order to find a clue to them, for Morgagni mentions the work of Cowper on the page following that which deals with the case quoted by Wall.

The significance of Dr. Wall's contribution seems to have been overlooked by medical historians, including those who have shown a special interest in the history of cardiovascular diseases. The standard textbooks on the history of medicine do not mention him, but I was surprised to discover that modern books on porcelain[8, 13] contain ample references to him. He was a man of considerable importance to his own community in the City of Worcester, for there is a good biographical sketch of him in the *Dictionary of National Biography* written by Norman Moore, M.D.

However, he could not have had a very great national reputation as an important physician in England, for he was not a Fellow of the College of Physicians. Of course, at this time it was exceptionally difficult to become a member of this august body. During the end of the eighteenth and the beginning of the nineteenth century, when the College was situated in Warwick Lane, a stone's throw from the Court House in Old Bailey,[6] fellowship was restricted by a by-law which excluded all those who were not graduates of either Oxford or Cambridge. An added restriction was the requirement for entrance into Cambridge and Oxford Universities open to members of only one denomination of the Protestant Church. These restrictions resulted in the collection of a company of eminent physicians outside the College, obviously eligible for fellowship, who reflected their glory on others who, though eligible, were in the company of non-fellows; Wall was among these for he was an Oxford man. The practice of writing a letter to a member of the College was indeed a very useful one, for it permitted the basic purpose of the College to be carried on.

John Wall was born at Pawick, Worcestershire, in 1708, the son of John Wall, a tradesman of Worcester City. He was educated at Worcester Grammar School and matriculated from Worcester College, Oxford, on June 23, 1726. He obtained his Bachelor of Arts in 1730 and migrated to Merton College, where he was elected a Fellow in 1735 and whence he took the degrees of Master of Arts and Bachelor of Medicine in 1736. After this he began to practise as a physician in Worcester and continued so until his death in 1776 at the age of 68. He led an unusually active life, engaging in many non-medical enterprises, but he published a number of medical tracts, which must have drawn considerable attention in his day. All these were compiled in the form of a book,[15] which was edited by his son, Dr. Martin Wall, who contributed a preface. Of the 337 pages in this book the letter to Heberden occupies 13. Moreover, this letter was written four years before his death and was his last medical publication. As it appeared in the 1785 volume of the *Medical Transactions*, its publication was posthumous.

Some idea of the medical subjects which engaged Wall's special interest may be gained from the table of contents of his collected works. The first item was published on October 21, 1744 on "The Extraordinary Effects of Musk in Convulsive Disorders". The second, published on March 10, 1747, dealt with the use of Peruvian bark in small pox. The third was a dissertation on "The Cure of the Putrid Sore Throat", published in *The Gentleman's Magazine* for December, 1751. This article reflects

the confusion of the times with respect to diphtheria and scarlet fever. The fourth was a paper concerning his experiences with one patient, using oil for the cure of worms. It is entitled "The Case of the Norfolk Boy" and was published on December 14, 1758. He first published a small pamphlet on the marvels of the Malvern Waters in 1756. This became quite a large pamphlet, almost a book, in its third edition, published in 1763. It occupies 199 pages of the volume of collected works and deals with the value of the Malvern Waters in a great variety of clinical conditions. The most important medical contributions, as we may judge them now in retrospect, occupy the smallest space. They consist of three letters. The first two are addressed to Sir George Baker, describing Wall's observations on lead poisoning and were quoted by Sir George in his famous communications to the College of Physicians.[2, 3] The third is the letter to Heberden about the case of angina pectoris, which revealed severe aortic valve disease at autopsy. It is noteworthy that what now appears as Wall's most significant contribution to the science of medicine was accomplished in the late evening of his life. These three letters represent his last medical works. The letter to Dr. Heberden was written when Wall was 64 years old; four years before his death.

The sketch of Dr. Wall's life written by Dr. Norman Moore in the *Dictionary of National Biography* mentions his interest in painting, but nothing of porcelain. Moore quotes from Dr. Martin Wall's preface to the collected works as follows: "An unremitting attachement to the art of painting engaged almost every one of his leisure hours from his infancy to his death." At least some of his pictures had enough merit to be hung in public buildings. His picture of the head of Pompey brought to Cæsar hangs in the Hall of Merton College. A close study of Martin Wall's preface reveals only a vague reference to his father's non-medical activities as follows: "He found time to attend to the establishment, protection and advancement of several public works from whence honour and emolument has been derived to the City and County of Worcester." I learned the meaning of this rather accidentally. In April of this year, when I was engaged in preparing this paper, I happened to be visiting my friend and neighbour, Mrs. R. J. Mercur, an erudite lady of 80 with a vast knowledge of art and literature. In order to account for my recent neglect of reading contemporary books, I explained that I was engaged in studying the biography of a doctor who was well-known in Worcester in the eighteenth century, but hardly known anywhere else then or since. After hearing the name, Dr. John Wall, she pondered a moment and then suggested that he might be the man who founded the Worcester porcelain works. Whereupon she produced two modern books on porcelain, in which she found confirmation of what she remembered. The story of English porcelain cannot be written without giving a high place of importance to the contributions of our Dr. John Wall. In 1751 he promoted the organization of a factory for the production of porcelain, using soapstone instead of bone-ash as the chief ingredient. Fifteen gentlemen were associated with him in making the necessary financial contributions. Soapstone was preferable to bone-ash among other reasons because "Cathedral nostrils must not be assailed by thoughts of a bone mill, whereas soapstone was a nice clean mineral from the sea." The venture was both a financial and an artistic success. No factory had such independence of style or has expressed the English character so successfully in porcelain. After Dr. Wall's death in 1776 the business had some ups and downs, but it still continues at the present day. The following few sentences from the book by Schmidt and Thorpe, published in 1932, merit quotation:

> "In 1783 the original company was dissolved, and the factory was bought by its London agent, Thomas Flight. It remained in his and his partner's families until 1840. A second factory was established at Worcester in 1786 by Robert Chamberlain, and remained in his family until 1840, when it amalgamated with the senior factory. Little need be said of their works; the genius of Worcester died with Dr. Wall. Thereafter the factory lost itself in classical design and pictorial landscape, and so fell into a jargon common to every one."

In the language of connoisseurs, the term "Wall China" refers to the finest Worcester porcelain, namely, that made during Dr. Wall's time.

The porcelain works did not seem sufficiently important to Martin Wall to merit being mentioned in what he wrote about his father, or perhaps one may read into this omission the tendency of the doctor's son to avoid the taint of trade in maintaining his own social stature as a physician and scholar. James Boswell[5] relates that one day in June, 1784, when Dr. Samuel Johnson was in his seventy-fifth year, "Dr. Martin Wall, physician at Oxford, drank tea with us. Johnson had in general a peculiar pleasure in the company of physicians, which was certainly not abated by the conversation of this learned, ingenious and pleasing gentleman." On the other hand John Wall, the son of a merchant, endowed with talents not only for scholarship and art, but for leadership and business as well, exercised his versatility in all directions, including the establishment of a flourishing business. Some idea of his progressiveness may be gained from the fact that in 1759 at the age of 51, after he had been in practice for 23 years as a Bachelor of Medicine, he obtained his Doctor of Medicine degree from Oxford.

The story of the life and works of Dr. John Wall of Worcester has a very special attraction, because it is not a story of one of the giants of art or science, but rather of one such as we meet

from day to day in our own active lives. His spark of genius, though relatively small, did create lasting benefits to mankind.

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Divisions of the Association

Prince Edward Island Division Canadian Medical Association

On the evening of June 19, under the auspices of the Medical Educational Committee of our Medical Society, we again gathered at the Charlottetown Hotel. Dr. E. Found acted as Chairman in the absence of Dr. L. Farmer, President of the Medical Society, and Dr. J. C. Houstan presided as Master of Ceremonies.

Following dinner a delightful and impressive ceremony was held for two of the oldest members of the Medical Society — namely Dr. Roderick MacDonald, 87, of St. Peter's and Dr. James A. Johnston, 82, of Tignish, who were first made members of the Order of Princes of Good Fellows and then each presented with an illuminated address. Dr. A. A. MacDonald, Souris, sponsor for Dr. Roderick MacDonald, in proposing a toast gave a sketch of the doctor's life, and the difficulties of the country practitioner and the high quality of service rendered by Dr. MacDonald throughout his long career. Dr. J. F. MacNeill, Summerside, sponsor for Dr. James Johnston, in proposing the toast to Dr. Johnston, spoke in glowing terms of the doctor's early life and medical career, and of his years of service to his patients. Dr. Johnston in replying, expressed his appreciation and said "The best reward is to see that my work has been appreciated by the younger members of the profession".

In Dr. MacDonald's unavoidable absence, due to the stress of professional duties, the Secretary, Dr. Murchison, accepted the address and badge presented to Dr. Roderick MacDonald *in absentia*.

Dr. Harvey Agnew, Toronto, Secretary of the Canadian Hospital Council, guest speaker, gave a concise and up-to-the-minute résumé of Health Insurance, dealing chiefly with those features relating to hospital services as being formulated in the various provinces. This talk was deeply appreciated. Dr. Agnew was warmly thanked for his timely address.

It is felt that the address presented to these two octogenarian members of our Medical Society merits publication for its universal application to men of like calibre still serving in the ranks of the medical profession.

Following is the address as presented:

To Dr. Roderick A. MacDonald,
St. Peter's Bay.

To. Dr. James A. Johnston, Tignish.

Greetings from your colleagues and associates in the Prince Edward Island Division of The Canadian Medical Association.

For over fifty years, as an exemplary disciple and follower of Hippocrates, you have carried out the arduous and self-sacrificing work of the family doctor. In this year of Our Lord 1945, when our thoughts are being liberated from the sordid things of life that have obsessed the minds and hearts of men during the years of the war, we stop a moment and pause in deep reflection.

The realization that men like you still live in our midst, and even after four score years of life are willing to continue to sacrifice for the good of their fellow men, regenerates in us our faith in the dignity of men, and raises high our hopes for the future.

The outstanding example you have been in your community, and the splendid inspiration you have always given to your younger colleagues, are brilliant stars in the firmament of your unusually long and successful professional career. Capable, ethical and willing in all your dealings with your patients, the public and your confrères, you are indeed the epitome of what each and every one of us has held up to the world as ideal of our great and noble profession. You do us honour indeed to be associated with you, and it is our sincere wish that you may enjoy many years of the robust health you have so long laboured to procure for the sick and suffering who come seeking your consult and advice.

This tribute is given to you by all your associates as a token of our sincere appreciation, and as a memento of the high esteem which we, the Medical Profession of Prince Edward Island, have for your continued presence among us.

Medical Societies

The Montreal Medico-Chirurgical Society

The month of July in Montreal is not usually the best time for a medical society meeting. But a man like Sir Alexander Fleming is an entirely reasonable excuse for holding a special meeting at any time: and on a typically hot July evening (the 11th) the Montreal Medico-Chirurgical Society welcomed him with an overflowing audience.

Sir Alexander gave no set paper, but his informal though clear and occasionally humorous account of the stages of the development of penicillin was delightful. He felt that it was a good example of typical individual research. It was quite true that in the later stages of production, team work and collaboration of groups was essential, but in the beginning it was an individual who made the so apparently simple observation regarding the effects of chance moulds on bacterial cultures, which opened the door to this extraordinary vista of antibiotics.

He felt too that probably it was providential there had been a lag between the original observations in 1929 and their translation into practical application in 1939 and later. It was the tremendous urge of war which drove governments to spend freely on developing penicillin. It had meant very great expenditures indeed, and it is doubtful if in peace time these would have been countenanced. And yet without the tremendous expansion in output (and he paid the fullest tribute to the part played by American workers in this respect) which provided the almost limitless quantities needed, the value of penicillin would have been crippled if not nullified.

Sir Alexander thought that it was hardly likely that in this one discovery we had exhausted the possibilities of antibiotics. Rather he looked forward to further and yet more striking developments in this field.

Special Correspondence

The London Letter

(From our own correspondent)

PARLIAMENT DISSOLVES

In ordinary times, the excitement of a General Election would not necessarily affect the medical profession, but on this occasion it has, of course, led to some postponement of discussions on the National Health Service and, no doubt, details of that Service may well be the object of comment in certain constituencies.

A few days before the end of dissolution, the House of Commons had a full-dress debate on the health of the nation, in which every effort was made to discuss the White Paper, without really much success. The Minister reviewed the effect of war upon the nation's health and there were many bright spots. The birth-rate was rising and the infant mortality rate was down to its lowest level last year at 46 per 1,000 births. This had happened with about 1/5 of the medical officers of the public health services in the Forces and almost 1/3 of the general practitioners.

On the black side, tuberculosis certainly stands higher and here the difficulty appears to be a shortage of nursing and domestic staff. References were made to this problem last month and it is certainly no easier now to get more beds opened that it was.

Sir John Orr, in a maiden speech, stressed food and housing as two great aspects of the health problem, and certainly as regards the latter, the election campaign is actively concerned.

RELEASE OF DOCTORS

Meanwhile, the question of release of doctors from the Services is of more interest to the profession than the election. Despite assurances that medical officers would get at any rate as equally fair a deal as any other men in the Services, there is a definite impression that there is going to be considerable delay.

The trouble is, of course, that doctors in the early groups for demobilization are in many instances just those, *e.g.*, specialists, whom it is not easy to replace, and although recruitment will go on up to a considerably higher age than for the ordinary population, the demands for the Far East may be as high as double those for Europe. The consulting physician to S.E.A.C. has recently revealed that in the Burma campaign a unit of a thousand men during the year supplied just about as many hospital admissions from illness, and since these conditions will prevail, in his words, "all the way to Tokio", there is going to be a constant demand for doctors, orderlies and nurses if the medical services are to maintain their record that for the first time in modern history they

have gone through a war without a single major breakdown.

Civilians will not grudge being short of doctors in these circumstances provided that they are assured that those in the Services are really fully employed. It is just here that there is dissatisfaction and unfortunately the evidence is hard to collect, since grousing in Europe may lead to a speedy despatch to the Far East. All that can be hoped for is a prompt end to all fighting and a return to normality.

PSYCHIATRIC SERVICES

From time to time, mention has been made of groups of the profession who have set up their plans for the future. Those in the psychiatric world have an unfortunate reputation for sectarianism and it is therefore quite remarkable that the three main bodies, namely, the Psychiatric Committee of the Royal College of Physicians, the British Medical Association Group and the Royal Medico-Psychological Association, have agreed upon a statesmanlike document making joint recommendations.

This pleads for Mental Health Authorities dealing with large areas, and close co-operation between these authorities, Public Health, Education, and the Voluntary Hospitals. Mental hospitals must be up-graded with larger staffs, both medical and nursing, and interchange of such staffs with the general hospitals. Mental hospitals must have medical committees and generally come to resemble much more those institutions where treatment rather than detention is the foremost aim. Psychological help in education, in industry and in dealing with delinquency must freely be supplied, and in general, psychiatry must in all essential respects be treated like other branches of medicine.

ALAN MONCRIEFF.

London, July, 1945.

University Notes

McGill University

Hon. Percy Vivian, Minister of Health and Public Welfare of Ontario, one of the outstanding public health authorities of the Dominion, has been appointed to the chair of health and social medicine at McGill University.

Dr. Vivian will not assume his new duties at McGill until some future date, to be agreed upon by the university and the Premier of Ontario, in order that he may carry to fruition several projects on which as Minister of Health in that province he is now engaged.

It was also announced by Principal James that the university has made arrangements for the purchase of the Sims House, Pine and Oxenden Avenues, together with the surrounding land, in order that the university's Department of Health may at once be established in quarters that will permit of appropriate expansion of its activities during the years that lie ahead.

Dr. Vivian is 42 years of age. He was born at Barrie, Ont., and attended the Barrie Collegiate before entering the University of Toronto, from which he graduated in medicine in 1926. He went for postgraduate training to the Henry Ford Hospital in Detroit, and for seven years practised medicine at Akron, Ohio.

He returned to Ontario for general practice at Port Hope and to become physician to Trinity College School.

In 1943 he ran as Conservative candidate in Durham County and upon election was made Minister of Health and Public Welfare in the Drew Cabinet. In the recent provincial election he polled the largest majority which any candidate has ever gained in Durham County, a traditional Liberal stronghold.

As minister, he initiated several new projects including the centralization program of establishment of county units for public health administration, establishment of fact finding bodies in such subjects as hospital research and treatment of cancer, development of a program in sickness insurance together with the augmenting of existing services of the department, with particular reference to tuberculosis and venereal disease control, and a new development.

Dr. Vivian has had administrative experience of a high order. His department in Ontario contains in all a staff of 3,400 and the annual budget is $12,000,000. His department supervises the health of nearly 4,000,000 people.

Miscellany

Penicillin and Gonorrhœa

[*Abstract taken from V.D. War Letter, U.S. Public Health Service, Washington, June 20, 1945.*]

Single-injection doses of penicillin in oil and wax mixtures, and 3-injection schedules employing water solutions of penicillin, now appear to offer the most efficient means of treating gonorrhœa. This is indicated by three recent studies of more than 2,000 patients, reported in the May, 1945, issue of *Venereal Disease Information.*

The schedules were developed to fit the needs of the physician in private practice and the out-patient clinic where treatment must be completed in a relatively short time. Many of the cases included in one of the studies were treated in offices and out-patient clinics.

Results of the studies indicated that the methods of treatment used are effective, safe,

and widely applicable. Few cases of allergic sensitivity were reported. No evidence of penicillin resistance was encountered, and there was encountered neither naturally penicillin-fast strains of gonococcus, nor indications of the development of penicillin-fastness under treatment. Ability of the methods to effect cure did not appear to be affected by sex or race of patients, or by failure of previous treatment.

One study was conducted at the Bellevue Hospital rapid treatment centre, in New York City; results of 4 different schedules of treatment administered to 675 women in the Bellevue study are shown in the following table:

Schedule	*Patients treated*	*Success, percentage*
100,000 units of sodium penicillin, aqueous solution, in 5 intramuscular injections of 20,000 units, 3 hours apart	275	96.0
150,000 units of sodium penicillin, aqueous solution, in 3 intramuscular injections of 50,000 units, 2 hours apart	185	97.3
150,000 units of calcium penicillin, in oil and beeswax, in a single intramuscular injection	49	96.0
200,000 units of calcium penicillin, in oil and beeswax, in a single intramuscular injection	166	84.3

A second study of 1,060 cases was conducted co-operatively by 137 physicians and clinics in various parts of the country to determine effectiveness of a single intramuscular injection of penicillin calcium suspended in an oil-beeswax mixture, and to discover the applicability of the method in a wide-scale attack on gonococcic infections. Results of the second study, in which both men and women were treated, were as follows:

Schedule	*Patients treated*	*Success, percentage*
200,000 units of calcium penicillin, in oil and beeswax mixture, in a single intramuscular injection	1,060	91.2

In a third study, conducted at the U.S. Public Health Service Medical Centre, Hot Springs, Arkansas, 311 women were treated with various oil and wax mixtures containing penicillin. Results were as follows:

Schedule	*Patients treated*	*Success, percentage*
50,000 to 150,000 units of sodium penicillin in various wax oil mixtures, in 1 or 2 intramuscular injections, 5 to 24 hours apart	158	87.0
150,000 units of sodium penicillin, in myricin and purified olive oil mixture, in a single intramuscular injection	61	98.4
150,000 units of penicillin, in a myricin-peanut oil mixture, in a single intramuscular injection	92	94.6

Of all the patients who failed to respond to a first course of penicillin treatment in the Bellevue study, only 3 failed to respond to retreatment. In many of the failure cases in the co-operative study, second injections of penicillin-oil-beeswax produced favourable results, or the patients were cured by multiple injections of sodium penicillin in water or in saline solution. All but one of the Hot Springs patients who failed on the first course responded to second courses of therapy with one or another method, and that one patient responded to a third course of treatment.

Abstracts from Current Literature

Medicine

Hyperthyroidism and Thiouracil. Palmer, H. V.: *Ann. Int. Med.*, **22**: 335, 1945.

In 50 cases treated with thiouracil no serious complications were encountered during one to ten months. No drug intolerance, idiosyncrasy, or refractiousness was found. Thus far leukopenia has been the only serious effect, and this has been transient; however, unless frequent blood examinations are made, this might represent an early step in the development of agranulocytosis. The depressant effect of the drug on the hæmatopoietic system must be anticipated throughout the course of treatment.

No case failed to respond to the drug, but some responded more satisfactorily than others. In general, the higher the initial basal metabolic rate, the more dramatic was the response. All cases improved first subjectively and then objectively. At present it is believed that all adjunctive measures enhance the efficiency of thiouracil but have little intrinsic curative properties.

No case has required operation, although planned elective thyroidectomy has been considered feasible for various reasons. The patient coming to operation is treated in the same manner as one with simple colloid goitre, with the exception that measures are taken to control the greater vascularity encountered in a thyroid treated with thiouracil. There have been no postoperative complications referable to treatment with thiouracil.

Microscopic sections of thyroid glands treated with thiouracil have exhibited varying degrees of hyperplasia and colloid content. Less hyperplasia and more colloid has been noted in sections of two glands treated with thiouracil and thyroxin. Sections of two glands treated with thiouracil and iodine were in every way similar to thyroids treated with thiouracil alone.

Over half of the cases received from 1 grain of desiccated thyroid to 1/80 of a grain of thyroxin daily, the dose being dependent upon the degree of exophthalmus present. In no case did the thiouracil effect appear to be inhibited by giving thyroid substance. There is a trend toward a state of normal endocrine balance on thiouracil therapy alone, but the restoration is brought about more quickly, more completely, and with less frequent unpleasant side actions when thyroid substance is given in combination with thiouracil.

Four cases observed for eight months have required no medication of any sort for the last three months of this period and as yet appear to be in a state of normal physiological equilibrium with basal metabolic rates in the range of plus 12%. Those who relapsed because treatment was discontinued too soon or because of intercurrent infection or emotional stress, reacted in the same manner as patients who developed recurrent hyperthyroidism following thyroidectomy. Such patients responded as satisfactorily to the second round of medica-

tion with thiouracil and thyroxin as they did at the beginning of treatment.

Because of the cyclic nature of Graves' disease the remissions obtained with any treatment must not be confused with "cures" except in that small group of patients who have fallen victims to the malady because of a definite etiological factor which can be removed.

S. R. TOWNSEND

Penicillin in Sulfonamide-Resistant Gonorrhœa. Scarcello, N. S.: *New Eng. J. Med.*, **231:** 609, 1944.

Two hundred cases of sulfonamide-resistant gonorrhœa were treated with penicillin. All cases had failed to respond to two courses of sulfonamides, each course consisting of at least 20 gm. of the drug, and in all cases a positive urethral or prostatic smear or culture, or both, was obtained. Urethral discharge was marked in amount in 129 cases, moderate in 16, slight in 46 and the remaining 9 cases had either a "morning tear" or a positive prostatic culture. The second sample of the two-glass test was clear in 75%.

Cure resulted in all patients, but 27 (14%) required two or more courses of pencillin. Dosage was varied at the start of the series but it was finally decided that 100,000 units, given as intramuscular injections of 20,000 units at two or three hour intervals, was the best method. Of 33 cases receiving 120,000 or 150,000 units a repeat course was required in only one instance. Eight of 63 cases receiving 100,000 units required further treatment and the necessity of this became more frequent as the dosage was lowered below this figure. More than 80% of all patients had no visible urethral discharge twenty-four hours after cessation of the first course of penicillin.

Two negative prostatic cultures and smears formed the criterion for cure. Gonorrhœal arthritis (3 cases) and prostatic abscess (4 cases) responded immediately to the penicillin, which did not, however, affect the course of acute epididymitis (22 cases).

NORMAN S. SKINNER

Surgery

Convulsive Factor in Commercial Penicillin. Walker, A. E. and Johnson, H. C.: *Arch. Surg.*, **50:** 69, 1945.

Interest by the authors in the effect of penicillin on the central nervous system was aroused by observing convulsive seizures following intramuscular injection, of the drug in a case of ventriculitis. Following this evidence experimental work was carried out with this drug on mice, cats, dogs and monkeys and convulsive manifestations were noted.

The authors conclude that the antibiotic and convulsive factors of penicillin appear to be closely related, for they are affected about equally by ageing, boiling and acidifying the penicillin solution and by dissolving the penicillin in alcohol. In human beings, penicillin applied to the cerebral cortex in doses of 10,000 to 20,000 Oxford units may produce convulsive manifestations.

G. E. LEARMONTH

Prophylaxis of Wound Infection. Peterson, L. W.: *Arch. Surg.*, **50:** 177, 1945.

Various antiseptics, as they have been discovered, have been used in wounds as early substitutes for cleansing. It was learned long ago that antiseptics strong enough to destroy bacteria in wounds would likewise have a harmful effect on tissues. Much as been written about the germicidal properties of soap. Notwithstanding the fact that the germicidal property of soap is unquestionable and that the irritative quality of soap in wounds is neither great nor particularly damaging, the superiority of cleansing with soap and water over other methods of cleansing wounds has not been definitely established.

In a series of experiments, made by the author, on 76 dogs, both clean and contaminated wounds were studied. The contamination was established by allowing a fixed amount of cultures of hæmolytic staphylococcus aureus to remain in contact with the wounds for a period of one hour prior to therapy. Peterson found that when the soaps were placed in actual contact with the uncontaminated fresh wounds, they produced a definite but slight irritation, noted only on microscopic examination. In contaminated wounds there was a definite increase in signs of infection when exposed to soap.

He concluded that gentle irrigation of the wound with isotonic solution of sodium chloride is the most effective prophylaxis of wound infection. He states that the best results in cleansing these small wounds in his experimental work were obtained by irrigating them with 1,000 c.c. of saline solution with no scrubbing, utilitizing the force of the stream as the washing mechanism.

G. E. LEARMONTH

A Modification of an Old and Simple Method of Treating Rectal Prolapse. Smith, G. V. S.: *New Eng. J. Med.*, **232:** 495, 1945.

End-results in treatment of rectal prolapse are relatively unsatisfactory because of morbidity, frequent recurrence and even mortality following operation. The literature records the use of compression amputation on 14 cases during the past twenty years with two deaths. The author reports five cases so treated, results being good in all but one in which two recurrences have taken place, and he feels that, with proper attention to details, this method offers more advantages than any other.

A piece of ordinary garden hose with an external diameter of 2.5 cm. is built up to a diameter of 3 cm. by winding adhesive around it. A few cm. from the end a trough is built up 1.5 cm. wide and 0.5 cm. deep through the use of adhesive of a width of 2 cm.

Under anæsthesia the bowel is fully drawn down and care exercised that no small bowel is present in the herniated pouch of Douglas. The lubricated hose is then inserted and the bowel strangulated at the line of the previously formed trough through the use of strong malleable copper wire. After several days the strangulated portion of the rectum will slough away with the hose.

The hose must not be inserted too far above the point of constriction as fæces will accumulate between it and the rectum and may be forced through a weakened area in the tissues. It is essential that strangulation be complete. Preoperative catharsis and postoperative opium are unnecessary with the routine use of succinylsulfathiazole, which obviates sepsis, and enemas can be given through the lumen of the tube. The only local treatment required is the daily use of soap and hot water, boric acid powder and dry dressings.

NORMAN S. SKINNER

Gynæcology and Obstetrics

Blood-pressure and the Incidence of Hypertension in Nulliparous and Parous Women in Relation to the Remote Prognosis of the Toxæmias of Pregnancy. Barnes, J. and Browne, F. J.: *J. Obst. & Gyn., Brit. Emp.*, **52:** 1, 1945.

An analysis has been made of the blood-pressures of 1,956 women. Of these 915 were nulliparous and 1,041 parous. Statistically significant differences could not be found between the mean level of blood-pressure in nulliparous and parous women at any age. There was no statistically significant difference in any age group between the percentages of nulliparous and parous women with blood-pressures over 120/80 or over 140/90. The number of pregnancies had no demonstrable effect on the mean level of blood-pressure in parous women. Pregnancy does not cause chronic hypertension. The level of blood-pressure in parous women is the same as it would be if they had never been pregnant. Pregnancy does not aggravate a tendency to hypertension, neither does chronic hypertension develop earlier in parous women. Though hypertension is a common remote sequel of toxæmia of pregnancy it is not caused by the toxæmia. Patients who develop hypertension following a toxæmic pregnancy would have done so if they had

never been pregnant. A tendency to hypertension often contributes to the severity to toxæmia. Toxæmia of pregnancy may be regarded as a temporary disorder closely associated with pregnancy and leaving of itself no permanent lesion. There is therefore no justification for terminating a toxæmic pregnancy prematurely in order to protect the mother from chronic hypertension. There is no evidence that pregnancy permanently aggravates hypertension already existing when pregnancy starts. There is therefore no justification for terminating an early pregnancy in a patient who has essential hypertension. P. J. KEARNS

The Spasmolysant Action of Magnesium Ions on the Tetanically Contracting Human Gravid Uterus. Abarbanel, A. R.: *Am. J. Obst. & Gyn.*, **49:** 473, 1945.

The magnesium ion has been graphically demonstrated to exert an immediate spasmolysant effect upon the tetanically contracting human gravid uterus. Magnesium abolished tetany induced by pituitrin, pitocin, pitressin, quinine, ergonovine and methergine. Satisfactory results were obtained by the intravenous administration of either 2 c.c. of 50% solution of magnesium sulphate of 10 c.c. of 20% solution of magnesium gluconate. Magnesium probably acts directly on the myometrium, slowing the rate of the contraction wave.

Induced uterine tetany may be prevented by the prophylactic administration of intravenous magnesium salts from three to five minutes after administration of the oxytoxic agent. Posterior pituitary hormone should not be given in a dose exceeding 1 I.U., that is 0.1 c.c. (1.5 minims) and should be measured out in a tuberculin syringe.

Magnesium ion has no demonstrable effect upon the pattern of uterine motility in the first stage of labour. It does, however, exert a definite analgesic effect. Calcium ion has little or no value as a spasmolysant upon induced uterine tetany.

Clinical applications for the use of the antispasmodic properties of the magnesium ion have been found in the following conditions: immediate relaxation of oxytocic induced uterine tetany (1) during induction of labour or management of secondary degree uterine inertia; (2) third stage of labour for a separated but incarcerated placenta, prevention of uterine tetany following use of oxytocic, relief of after-pains, alleviation of essential spasmodic dysmenorrhœa, relaxation of Bandl's ring and relaxation of tetanically contracted uterus in abruptio placentæ. ROSS MITCHELL

Surgical Complications During Pregnancy and Labour. Scott, W. A.: *Am. J. Obst. & Gyn.*, **49:** 494, 1945.

When fibroids complicate pregnancy, conservatism in treatment is usually indicated. Ovarian neoplasms usually require operation during pregnancy. Correct diagnosis of appendicitis during pregnancy is frequently difficult.

Symptoms due to pregnancy or to attempts to produce abortion may lead to erroneous diagnosis. A large percentage of pregnant patients sent to hospital because of acute appendicitis do not have the disease.

In the treatment of hyperthyroidism and pregnancy the following points are important: (*a*) is hyperthyroidism really present? (*b*) if so, is the condition an exophthalmic goitre, or a toxic adenoma? If the former, conservative treatment will often be satisfactory, but if toxic adenoma is present, surgical treatment is indicated. ROSS MITCHELL

Plastic Surgery and Burns

Tattooing of Free Skin Grafts and Pedicle Flaps. Byars, L. T.: *Ann. Surg.*, **121:** 644, 1945.

Pigments employed in tattooing must be non-poisonous, non-irritating to tissues, extremely insoluble, and inert to body metabolism. Those used have been supplied by firms supplying professional practitioners. Injection should be done aseptically. The procedure is somewhat painful in normal skin. Novocaine block of the area to be treated is more satisfactory than infiltration. The mixture should be a shade darker than the skin.

The pigment is picked up on needle points and inserted obliquely into the depths of the skin. Needle pricks must be very close together. Dispersion of the pigment occurs with time. Fairly severe inflammation, lasting seven to ten days, follows. Desquamation occurs. The colour gradually diffuses and pales. Patchy areas may appear. A second treatment is often needed. It is better to under-pigment than to over-pigment.

Tattooing is used (1) to match contrasting areas; (2) to simulate missing lip vermilion; (3) to blend in rather patchy scarred areas; and (4) to camouflage bald areas within the eyebrows. Hard scarring interferes with the insertion and spread of the pigment. Soft scars may be injected. Skin grafts should not be tattooed until they have achieved their greatest degree of relaxation and flexibility. The white graft is best, but yellowish or brown grafts can be improved. Simulation of the normal lip vermilion aids greatly in producing a normal looking result. Bald areas in the eyebrows may be well camouflaged. Occasionally small bald areas within the scalp may be made less noticeable. Attempting to stipple a bald area on the bearded portion of the face is likely to cause an unsatisfactory dirty appearance.

The author states that intradermal pigment injection has been done in over sixty cases, without complication, and with improvement in each case. The degree of improvement varies with the type of case and skill of injection.

Full Thickness Skin Grafts from the Neck for Function and Colour in Eyelid and Face Repairs. Brown, J. B. and Cannon, B.: *Ann. Surg.*, **121:** 639, 1945.

Full thickness grafts from the neck and clavicular region have been found to give superior results in the repair of eyelids, nose, and in areas about the mouth. Two main advantages are improved function and colour. So far none of these grafts have had pigment injection to improve colour. Improved function is due to softness and thickness of the graft. There is minimal contraction of the graft bed.

Donor sites can be closed, left open, or grafted. Scars may be troublesome for a while. No permanent severe trouble has been seen. Large scars would be objectionable in women, but small grafts may be taken.

The grafts are usually cut just above the inner third of the clavicle. They are cut to pattern. Fingers are used to hold the graft, rather than forceps or hook. The grafts are sutured accurately using interrupted sutures of light silk. The ends of the sutures are left long for subsequent fixation of dressing. The graft is not perforated. Dressings are done on the third to sixth day; and left off about the tenth day.

Orthopædics

The Development of Sarcoma in Bone Subjected to Roentgen or Radium Irradiation. Hatcher, C. H.: *J. Bone & Joint Surg.*, **27:** 179, 1945.

Three cases of bone sarcoma developing after irradiation are presented in detail with a review of others in the literature. These three cases all had the primary tumour removed by surgery and irradiation and then later developed a second entirely different tumour in bone adjacent to the original bone, which had evidently been affected by the irradiation. Case 1 had a benign giant cell tumour in the proximal epiphysis of the tibia and seven years later developed a chondrosarcoma of the proximal end of the fibula. Case 2 had a benign giant cell tumour of the distal end of the radius and eleven years later developed a fibrosarcoma of the distal end of the ulna. Case 3 had a carcinoma of the right breast removed and twelve years later developed a chondrosarcoma of the seventh rib. In all cases irradiation was large in amount and administered in fractional doses over a long period of time. GUY H. FISK

Treatment of Benign Giant Cell Tumours by Resection or Excision and Bone Grafting. Meyerding, H. W.: *J. Bone & Joint Surg.*, **27:** 196, 1945.

On the basis of results with forty cases of benign giant cell tumour of an extremity the author believes that excision and bone grafting is the treatment of choice. Wide excision should be performed and every particle of tumour tissue removed. The graft is taken from the tibia, fibula, or ilium and fills the cavity left by the excision preventing collapse and deformity in the limb. Of the forty patients thirty-eight had a good functional result while two did not. GUY H. FISK

Radiology

Idiopathic Spontaneous Pneumothorax: History of 100 Unselected Cases. Schneider, L. and Reissman, I. I.: *Radiology*, **44:** 485, 1945.

A study was made of 100 unselected cases of spontaneous pneumothorax of the so-called idiopathic type, which had occurred in selectees for military service months to years before induction examination. This condition occurs most commonly in the age group twenty to thirty years. Spontaneous pneumothorax may appear asymptomatically, as occurred in 5% of this series. From its discovery on routine chest roentgenograms, it may be assumed that this accident is more frequent than clinically supposed. There is no notable predilection for one side of the chest rather than the other. Recurrences take place in about 20% of the cases, and on the same side. Recurrence was uncommon in men over thirty years of age.

Spontaneous pneumothorax occurred more often in this series during relatively slight physical exertion or with the patient at rest than following undue physical stress or strain. Roentgenograms of the lungs taken months to years after re-expansion of the collapsed lung were negative in all but four instances. In the great majority of cases, one cannot tell from the film that a pneumothorax ever existed, nor could it be predicted from the film whether or not the patient would sustain a future recurrence. On the contrary, numerous cases of bullous emphysema seen at the Induction Station gave no history of spontaneous pneumothorax.

Many of the men were unduly apprehensive as to the possibility of future complications—recurrences and sequelæ. R. C. BURR

Photoelectric Timing in General Roentgenography. Hodges, P. C. and Morgan, R. H.: *Am. J. Roentgen.*, **53:** 474, 1945.

This paper deals with the application of automatic timing to general roentgenography, which includes the roentgenographing of such parts as the spine, the pelvis, the urinary tract, the gallbladder, the chest, the shoulder, the skull, the extremities with and without intensifying screens and with and without the Potter-Bucky grid. This detailed article cannot be satisfactorily summarized. R. C. BURR

Roentgen Demonstration of the Semilunar Cartilages of the Knee. Grossman, J. W. and Minor, H. H.: *Am. J. Roentgen.*, **53:** 454, 1945.

The purpose of this paper is to present a roentgen technique for the demonstration of the semilunar cartilages of the knee joint by the injection of air into the joint. The technique is simple and can be performed in any roentgenographic room. It does not require hospitalization. It is harmless and has not produced any untoward effects or aggravated any existing symptoms. In many cases it has demonstrated the cruciate ligaments. This, however, has not been the primary objective of examination.

It will demonstrate the presence of a torn meniscus and it will indicate which cartilage is involved. Two important facts have been demonstrated: (*a*) The lateral meniscus is fractured more often than is generally believed. (*b*) In many cases both cartilages are torn. R. C. BURR

Anæsthesia

The Use of Spinal Anæsthesia to Control Sympathetic Overactivity in Hyperthyroidism. Knight, R. T.: *Anæsthesiology*, **6:** 225, 1945.

A number of writers have stressed the fact that hyperactivity of the adrenal glands takes a considerable part in the syndrome of hyperthyroidism. Rea of the surgical staff of the University of Minnesota has previously reported upon the use of spinal anæsthesia to assist in the control of this condition in twenty cases. The present author mentions four other patients operated upon at the University of Minnesota Hospital under this regimen with similar operative and postoperative results. Spinal anæsthesia has been used in the treatment of postoperative thyroid crisis, and more recently as an aid in control during the operative period.

Spinal anæsthesia is not administered with the purpose of providing or even assisting the anæsthesia for the surgcial procedure. The purpose is solely to anæsthetize that part of the sympathetic nervous system which innervates the adrenal glands and, therefore, to reduce the secretion of epinephrine both immediately before operation and as a result of the increase of thyroxin in the circulation as a result of manipulation of the gland.

The custom is for the patient to be anæsthetized in his room with an intravenous injection of sodium pentothal, after which he is taken to the operating room asleep. In ordinary cases the anæsthesia is continued with cyclopropane or ethylene, but for the few patients who have been especially resistant to the preoperative treatment, spinal anæsthesia is added while the patient is still under the influence of the pentothal and before the commencement of the cyclopropane supplement.

The level of anæsthesia obtained by the spinal anæsthetic should be up to approximately the fifth, or possibly the fourth, thoracic segment. If it does not go this high there will be too much sympathetic and adrenal activity. At first procaine was the drug employed in doses of 80 to 150 mgm. at the level of the first lumbar space. During the last year however, they have chosen pontocaine rather than procaine in several cases and have diluted it with dextrose solution in order to increase the specific gravity and to make the technique described effective. They are inclined to believe that the added duration of anæsthesia with pontocaine is of considerable benefit to these toxic cases.

In an attempt to avoid the use of ephedrine to support the blood pressure following spinal anæsthesia, the author met with some instances of severe falls in blood pressure within ten minutes after the introduction of the spinal anæsthetic. It had been considered before this that the introduction of ephedrine would nullify the purpose of the spinal anæsthesia in checking the adrenal activity. However, following these untoward results, he has used ephedrine in carefully selected amounts, 20 to 40 mgm., which is just enough to maintain the blood pressure at the same or a little lower level than existed preoperatively, and he does not believe that these nullify the beneficial effect of the spinal anæsthesia to any appreciable extent. F. ARTHUR H. WILKINSON

Hygiene and Public Health

Air Borne Tuberculosis: *J. Am. M. Ass.*, **126:** 707, 1945.

The editorial refers to experiments by Perle (*J. Exper. Med.*, **45:** 209, 1927) in which normal guinea pigs exposed in the same cages to guinea pigs infected with bovine tuberculosis readily contracted tuberculosis apparently from infection by way of the intestinal tract. Normal guinea pigs placed in the same room with infected guinea pigs, but not in the same cages, seem

occasionally to develop respiratory tuberculosis presumably from air borne infection.

Lurie (*J. Exper. Med.*, **51:** 743, 1930) in an experiment in which 27 cages each with 2 normal guinea pigs were distributed in a large room containing 500 experimental animals many of whom were tuberculous found the following results: in 6 months no pigs developed tuberculosis; in 6 to 12 months 9.1% developed tuberculosis; in 12 to 18 months 27.7% developed tuberculosis; in 18 to 24 months 35.3% developed tuberculosis. Of the 20 pigs who did not develop tuberculosis in 2 years only 1 was subsequently infected. It is presumed that these pigs were naturally immune.

In later experiments Lurie (*J. Exper. Med.*, **79:** 559, 1944) tried the effect of ultraviolet light in preventing air-borne tuberculosis. Two rooms were prepared each containing a battery of cages for normal rabbits and another battery of cages for infected rabbits. In the test room the space between the normal and infected animals was flooded with ultraviolet light. In the control room no ultraviolet light was used in the space between the infected and normal animals. The normal animals in both rooms were litter mates of the same inbred genetically uniform animals.

In the non-irradiated room in a typical experiment all 15 rabbits developed a high degree of skin sensitivity and 9 died of tuberculosis. In the irradiated room no rabbit developed skin sensitivity at the end of 12 months. One rabbit developed a questionable pulmonary lesion from which tubercle bacilli were isolated by a guinea pig test.

FRANK G. PEDLEY

Industrial Medicine

Findings of the Study of Chronic Disease in the Eastern Health District of Baltimore. Downes, J.: *Milbank Mem. Fund Quart.*, **22:** 337, 1944.

The author presents a five-year study of illness among the white families in the Eastern Health District of Baltimore, in which the wage-earning population lives. This was conducted in order to obtain an accurate and complete picture of the extent of chronic disease in a closely observed population and the extent to which medical care was obtained by a population which had unusual medical facilities.

Before discussing illness among the chronic disease patients and their families, the author presents a picture of the total population studied, with respect to the following classes: (1) those who reported no illness; (2) those who experienced one or more illnesses of acute nature only; (3) those reporting the presence of a chronic condition. The percentage of persons of both sexes reporting some illness was relatively high in the very young and in the aged; the proportion reporting no illness was highest in young adult life and lowest among the young and the old. Chronic disease was present among persons of both sexes under 20 years of age; it plays an increasingly important part in the proportions sick after age 30. Among persons 60 years or older, 50% of those reporting have chronic disease.

A detailed account follows with figures and charts, of the incidence and severity of illness among cases of chronic disease, particularly as concerns the ambulatory chronic disease patient 40 years or older. When the frequency of attacks of illness of a non-chronic nature was considered, it was found that the ambulatory chronic disease patients had a rate of illness 62% higher than for persons of the same age having no chronic disease. There was no evidence that the severity of these attacks of non-chronic illness, when measured in terms of disabling days, bed days and hospital days per disabling attack was any greater than that of similar attacks among persons with no chronic illness. Disabling attacks of chronic disease were more severe among males than among females.

Taking into consideration the non-ambulatory as well as the ambulatory cases of chronic disease, in the population 40 years and older most of the disability from illness was concentrated in a small proportion of the total population. Persons with no chronic disease formed 80% of that population.

In a special study made of families with one or more chronic cases, it was found that persons in these chronic-disease families formed 26% of the total observed population had 54% of the total illnesses. and received about 50% of the medical care for illness given to the total population. Detailed records are given of 2 families to illustrate the sickly and the non-sickly family.

MARGARET H. WILTON

Rôle of Industrial Medicine in the Rehabilitation of Veterans. Johnson, J. F. and Hoffman, H. V., *J. Am. M. Ass.*, **126:** 1073, 1944.

About 85% of veterans now returning are satisfactory employees. They adjust themselves easily to their jobs and differ very little from the civilian worker in industry. A certain group however need advice in reconstructing their lives. In this article the author, who is medical director, Eastern Aircraft-Trenton Division, General Motors Corporation, Trenton, N.J., presents the personal observation of a physician in an industry which is aware of its responsibility to some of the veterans. They stress the fact that cases cannot be settled by generalities, as the problems are individual and require individual evaluation and disposition. Of the disabilities found, the neuropsychiatric group amounts to a large fraction of the whole.

It has been estimated that the manufacturing industry will probably employ one out of every seven veterans returning. For proper job placement, a true record of the physical and mental status of these men is necessary. It should be recognized that not all veterans can safely be given a job in the field in which they wish to work; many will be restricted in placement.

The authors outline the procedure followed in their plant when placing the returning veteran and in particular, those who need medical or welfare attention. In the absence of a medical department in an industrial establishment, some local Veterans' Administration office should function to evaluate physically and mentally the proper placement of the veteran. It is suggested also that the Veterans' Administration Service issue a directive, instructing all factories which employ veterans as to what to do with the various types of cases.

A few case histories are presented, of individuals, who, in the author's opinion, were veterans only because the preinduction military service examination did not weed them out. These illustrate the necessity of finding the "real" cause of discharge versus the "alleged" cause.

MARGARET H. WILTON

Obituaries

Dr. Gerald Caza died at his home in St. Johns, Que., on July 1. He was in his 41st year.

Born in St. Anicet, Que., Dr. Caza had practiced in St. Johns for the past 18 years after graduating from McGill University. He was the son of John Caza and of the former Etta Leahy.

Surviving are his widow, the former Mary Gurney; one son, three daughters, his brother, and three sisters.

Dr. Lorne H. Cook, Toronto, died on June 21. He was born in 1889 and was a graduate of the University of Toronto (1914).

Dr. D. W. Davis, of Kimberley, B.C., died on July 1. He was born in 1887 and was a graduate of McGill University (1909).

Dr. Alexander Fisher, well-known Toronto physician until his retirement to near-by Stoney Creek four years ago, died June 9.

Born in Perth County, Dr. Fisher attended school in Woodstock, and Stratford and graduated in medicine from the University of Toronto in 1902.

Surviving are his widow, five children, Archie, of Vancouver; Alexander, of Hamilton; Watson, with the Royal Canadian Navy in Halifax, and two daughters, Mrs. H. R. Roberts and Miss Christine Fisher, both of Toronto. Two brothers, James and Archie, live in Toronto, and a sister, Katherine Fisher, of New York.

Dr. W. B. Halladay, of Clifford, and formerly of Walkerton, died on June 14.

He was the youngest of a large pioneer family of the late Thomas and Margaret Halladay, who settled in the Township of Brant in the early years.

His education was obtained at Pearl Lake Public School and Walkerton High School followed by teaching for a time at Vesta public school, later graduating from the Dental College, University of Toronto.

His practice was first at Mount Forest for a time and then he located in Walkerton where he had a long, successful career. Later he moved to Clifford.

He took a keen interest in all worthwhile activities of town and community, and was Mayor of Walkerton for a term of three years. He was held in high esteem by all who knew him, was interested in all good works and gave consistent encouragement to all worthy projects. He was a loyal and devoted servant and a leading layman of his church, being for years an elder and representative to both presbytery and conference sessions. He was a member of the Masonic Order also of the Independent Order of Foresters.

Surviving are his widow and Mrs. H. Tovell and Mrs. Frank Bolden, sisters.

Dr. George Arthur Henry, of Beamsville, Ont., died on June 8. He was born near Beamsville, on February 27, 1874, a son of the late Mr. and Mrs. James O. Henry. He attended Beamsville High School and St. Catharines Collegiate. Dr. Henry had not always been a physician. Following a year at London Normal School, he taught for about 15 years. He then entered Queen's University and graduated in medicine in 1915. He began his practice in Sudbury, where he remained until his death.

He was a member of the Ontario Medical Association, a member of the Cope-Stone Lodge, No. 373, A.F. and A.M., Welland and the Ancient Frontenac and Cataraqui Chapter, No. 1 of Royal Arch Masons, Kingston. He was a past master of L.O.L. No. 141, Welland.

Dr. T. C. Irwin, of Grand Rapids, Mich, died on December 9, 1944. He was born in 1866 and was a graduate of Trinity College (1891).

Dr. Newbold Coursolles Jones, a partner in the firm of Jones, Heward & Co., died on June 15.

Dr. Jones was born in Gananoque, received his doctor of medicine degree at McGill University, and studied in Germany. He served overseas as a doctor during the Great War, before which he practiced his profession in Toronto.

Soon after returning to this country he left his practice, founding the stock brokerage firm of which he was partner at the time of his death. In 1942 he became president of Ontario Steel Products.

He leaves his wife, the former Zippie Millicent Jones, a son, David Ford, with the Canadian Navy overseas; and two daughters.

Surgeon Lieut.-Com. J. Vining McCutcheon, formerly of London and Toronto, was killed recently while on active service in Australia. Enlisting in the Royal Canadian Navy in 1940, Lieut.-Commander McCutcheon was loaned to the Royal Navy and went overseas in 1941. He served in the North Sea, in Nigeria, South Africa, in the Mediterranean and in England. He received his present commission while in the Mediterranean.

Born in London, he moved to Toronto and graduated from medical school at the University of Toronto. His wife, Helen Jean McCutcheon, is now serving with the British Government in Ceylon after going overseas from Canada with the Mechanized Transport Corps.

Lieut.-Commander McCutcheon is survived by two brothers, Major W. C. McCutcheon, R.C.A.M.C., Military Hospital, Montreal, and M. W. McCutcheon, deputy chairman of the Prices Division, W.T.P.B.

Dr. John Alexander MacDonald died at Glace Bay, on June 11, 1945, after a brief illness. He was born at Harbor Boucher, a son of the late Mr. and Mrs. Hugh MacDonald, and at the time of his death was sixty years of age. He was a graduate in Arts of St. Francis Xavier University, and received his degree in Medicine from Dalhousie University in 1909. He practised first at River Hebert, then at Glace Bay, and finally at St. Peters.

In 1916 he was chosen Conservative candidate for Richmond County in the Provincial election and was elected. He was re-elected in 1920, but resigned in 1925 to become a candidate for the Federal House. He represented Richmond County at Ottawa from 1925 to 1930 when he resigned his seat in favour of the late Honourable E. N. Rhodes, who was then appointed Minister of Fisheries, and later Finance Minister. In February, 1932, Dr. MacDonald was appointed to the Senate. Up to the time of his death he continued an active practice at St. Peters in the intervals when he was not residing in Ottawa.

Dr. Frank McEwan, son of the late Dr. and Mrs. William McEwan of Wiarton, died suddenly of a heart attack at his home in Nordegg, Alberta, on Wednesday, May 31.

He is survived by two brothers and five sisters: Alex., in Michigan, Ewart, in St. Catharines, Mrs. Hicks, Toronto; Mrs. Flood and Mrs. Clark, Winnipeg; Mrs. Legge, Toronto; Mrs. Messer, Vancouver. The late Mrs. Robt. Ward of Wiarton was also a sister. His wife predeceased him in 1936.

Dr. J. F. McKee, of Chicago, Ill., died on September 28, 1944. He was born in 1868 and was a graduate of the University of Toronto (1894).

Dr. Andrew Pritchard MacKinnon, of Winnipeg, died on June 14 after a long illness. Born at North Wakefield, Quebec, in the Gatineau valley near Ottawa, he came to Manitoba with his parents in 1883. He was educated at Griswold, Portage la Prairie and Winnipeg, and at the age of 21 he was principal of a school in Portage la Prairie.

Graduating from Manitoba Medical College in 1907, he began practice in Portage la Prairie. In 1916 he went overseas with the 11th Canadian Field Ambulance and on his return in 1918 he served in the orthopædic wards at Fort Osborne Military Hospital. He spent six months in Manitoba Sanatorium where he acquired a knowledge of tuberculosis which later proved of great service in his chosen field of orthopædics. In 1920 he became a partner of the late Dr. H. P. H. Galloway, and on the death of Dr. Galloway he headed the MacKinnon Clinic.

Many honours and responsibilities came to him in his quarter century practice as an orthopædic surgeon. He obtained the Ch.M. degree in 1922, became Fellow of the Royal College of Surgeons of Canada, Fellow of the American College of Surgeons in 1923, and a Fellow of the American Academy of Orthopædic Surgeons. He was president of the Winnipeg Medical Society, chief of the Orthopædic staff of St. Boniface Hospital, consultant at Manitoba and St. Boniface sanatoria in bone and joint surgery, and lecturer in orthopædic surgery in the University of Manitoba medical faculty. He was a member of the Theta Kappa Psi medical fraternity.

He contributed a number of scientific papers in orthopædic surgery to the *Journal of Bone and Joint Surgery* and to the *Canadian Medical Association Journal.*

He is survived by two sons, one of whom is serving with the R.C.A.F., three brothers, of whom one is Major Alexander G. MacKinnon, R.C.A.M.C., of Norman Wells, N.W.T., also three nephews and two nieces serving with the armed forces. Major W. B. MacKinnon, R.C.A.M.C., a nephew, is a member of the MacKinnon Clinic.

A man of the highest principles, Andy MacKinnon could always be relied upon to give the best that was in him in service to his patients and to his profession. His life was marked with uprightness and integrity.

Dr. Charles MacLachlan, of New Rockland, North Dakota, died on October 7, 1944. He was born in 1861 and was a graduate of the University of Toronto (1889).

Dr. James W. MacNeill died recently in North Battleford, Sask. Dr. MacNeill was born in Prince Edward Island and graduated from McGill University in 1901. His successful medical and public career in his adopted province of Saskatchewan was a source of pride to his many friends in his native province. Dr. John F. MacNeill, a brother, is still practicing in Summerside, P.E.I.

Dr. John Bartley March died at his home at North Brookfield, June 1, 1945, after an illness of three weeks. He was born at St. Georges, N.B., 85 years ago, a son of Rev. Stephen March and Elizabeth Keating March. He graduated in Arts from Acadia University, Wolfville, and from the University of Michigan in 1885. His first practice was at Riverport for three years, later at Bridgewater for twenty years, and then at North Brookfield.

Dr. A. J. Moody, of Brechin, Ont., died on May 9. He was born in 1892 and was a graduate of the University of Toronto, 1917.

Dr. E. H. Peterson, of Grand Junction, Col., died on April 13, 1945. He was born in 1883 and was a graduate of Queen's University (1919).

Dr. Mamoru Sanmiya, Canadian-born Japanese doctor, died June 9 in Queen Alexandra Sanatorium in his 29th year. Dr. Sanmiya was born in Vancouver and lived in Edmonton 10 years. Two years ago he graduated in medicine and spent a year in the pathological department of the Edmonton General Hospital. He interned at Lamont Public Hospital, Lamont, Alta.

Dr Louis Joseph Octave Sirois. Nous avons appris avec un vif regret la mort, survenue le 23 mai à St-Ferdinand d'Halifax, où il demeurait depuis 1888, de M. le Dr Louis-Joseph-Octave Sirois, médecin bien connu.

Né à Grande-Rivière (Gaspé) le 28 janvier 1863, fils de J.-O. Sirois, officier de douanes, et de Catherine-Cécile Carbery, le docteur Sirois fit ses études classiques au Séminaire de Rimouski, de 1874 à 1883; bachelier-ès-Arts, il étudia la médecine à l'Université Laval de Québec et fut reçu docteur en Médecine en 1887. Il exerça sa profession au Bic, pendant quelques mois, et il s'établit ensuite à St-Ferdinand d'Halifax où il pratiqua toujours depuis.

Il fut Gouverneur du Collège des Médecins, de 1898 à 1916. Vice-président du Collège des Médecins, de 1909 à 1912. Premier président et fondateur de la Société Médicale d'Arthabaska, de 1902-1908. Vice-président de l'Association des Médecins de l'Amérique du Nord, 1906-1908. Il était membre de l'Association Médicale Canadienne et de l'Association Médicale de la Province de Québec. Il collabora à l'Union Médicale, à la Revue Médicale de Montréal (qu'il rédigea pendant deux ans) et au Bulletin Médical de Québec.

Dr. J. R. Walls, of Springerville, Ariz., died on November 29. He was born in 1867 and was a graduate of Trinity (1891).

News Items

Alberta

Two Edmonton medical men, Lieut.-Col. John W. Bridge, M.B.E., and Major C. W. Harry Weinlos returned to Edmonton after more than five years' overseas service with the R.C.A.M.C.

Lieut.-Col. Bridge went overseas with the 4th Casualty Clearing Station and has served at No. 2 General Hospital in England, and the medical corps in France. He was made a Member of the Order of the British Empire in the 1944 New Year's honours' list.

A graduate in medicine from the University of Alberta, Lieut.-Col. Bridge practiced here until he enlisted in 1939.

Major Weinlos, on the medical staff of the University Hospital before he enlisted on the first day of the war, is a son of Isaac Weinlos. He served at several Canadian hospitals in England. His brother, Major Morris Weinlos is also a medical graduate of the University of Alberta. He enlisted on the same day and went overseas in January, 1940, with his brother.

The following doctors have recently gone overseas from Military District No. 13, Alberta: Major T. F. H. Armitage; Captains H. L. Stewart, P. B. Rose, B. R. Townsley, W. C. Prowse, T. G. Otto, R. G. Williams, G. A. Nicholson, M. J. Miller and R. G. Wolff.

Dr. H. B. Armstrong has been loaned from the Forces to meet the need of a physician at Barons. He is a recent graduate of the University of Alberta.

Flight Lieut. Ronald Horner, R.C.A.F., has been posted from Calgary to Rivers, Manitoba.

Dr. Jean Holowach, of Calgary, has received a fellowship in pædiatrics at the George Washington University in St. Louis, Missouri, under Dr. Hartmann.

At a meeting of the Calgary Hospitals Board held on June 28, it was decided to immediately campaign for a new 600 bed hospital to be erected on a new site at a cost of approximately $3,000,000. It was also unanimously decided to advertise for a full-time superintendent. A by-law will have to be submitted to the citizens next fall to ratify these proposals.

G. E. LEARMONTH

British Columbia

Several members of the profession who attended the meeting of the Canadian Medical Association have returned to British Columbia. Amongst these are Drs. F. M. Bryant and P. A. C. Cousland, of Victoria, F. M. Auld, Nelson, A. H. Meneely, Nanaimo, G. O. Matthews, H. H. Milburn, A. H. Spohn and Ethlyn Trapp, of Vancouver. The last named is the newly elected President of the Canadian Medical Women's Association, and will preside at the meeting of this organization to be held in Vancouver in 1946 when the parent body holds its annual meeting here.

Dr. L. E. Borden, of Nelson, has retired from active practice. He is one of the oldest practitioners of medicine in this area and has been practising for almost forty years. He served in the R.C.A.M.C. in the last war, and has been an outstanding man in the community. We wish him a long and happy retirement.

Dr. C. A. McDiarmid, of Vancouver, has been very ill, and is still in hospital. The hopes of all are for his speedy recovery.

Dr. E. W. Boak, of Victoria, has returned to practice after an illness of many months. Another Victoria doctor who has been ill and is now back at work is Dr. W. H. Moore. Victoria has been having its share of illness among medical men.

Among the men returning from overseas we note the following names: Major K. J. Haig and Major J. W. Shier who are now on duty in the Pacific Command. On leave are Major L. W. Bassett, of Victoria, Major J. Ross Davidson, Vancouver, Major J. Ireland, Major Henry Scott, Major J. A. Wright and Capt. C. C. Covernton.

Transfers overseas include: Lieut.-Col. R. A. Palmer, R.C.A.M.C., of Vancouver, who has gone to Germany with No. 16 General Hospital, and Major A. C. Gardner Frost, R.C.A.M.C., who is now with No. 22 General Hospital in Great Britain.

Capt. G. E. Langley, has returned to civilian practice in Vancouver. J. H. MACDERMOT

Manitoba

The Sanatorium Board has agreed to operate for the Indian Affairs Branch of the Dominion Government a hospital on Clearwater Lake, twenty miles north of The Pas. This hospital was built at a United States air base and is well equipped. Over sixty Indian patients are available at the present time.

The tuberculosis deaths in Manitoba for the year 1944 were 181 whites, 123 Indians. The combined tuberculosis death rate for whites and Indians was 41.8 per 100,000 and for whites alone 24.9. This is a gratifying reduction from 1943 when the combined rate was 52.9 per 100,000.

A total of over 59,000 x-ray chest examinations were made in 1944 in the campaign to eliminate tuberculosis.

An organization meeting of the recently appointed commission under the Health Services Act was held on June 26. An executive committee was appointed consisting of Judge J. M. George, Dr. F. G. McGuinness, Winnipeg; Dr. H. S. Evans, Brandon; M. Henri d'Eschambault, St. Boniface; and Dr. F. W. Jackson, deputy minister of health.

Four committees were named, headed respectively by Dr. F. W. Jackson, Dean A. T. Mathers, Dr. A. Hollenberg, Winnipeg, and Judge George. The first committee is to prepare regulations for operation of local health units, the second to draw up regulations governing diagnostic services, the third to revise contracts for municipal medical services, and the fourth to prepare regulations for general procedure of the commission. Dr. Jackson was appointed secretary of the commission.

Manitoba Medical Service continues to grow. At May 31 the total participants numbered 14,784. Contrary to the expectations of the sponsors of the scheme, the public has preferred Plan B which provides general coverage before Plan A which is limited to hospital surgery and obstetrics.

Wing Commander H. W. Riley, R.C.A.F., and Flight Lieutenant D. B. Stewart, R.C.A.F., were mentioned in despatches in the King's Birthday list recently.

A new $150,000 wing is being contemplated for Grace Hospital, Winnipeg. It will contain two additional operating and case rooms as well as space for an additional 50 beds.

The shareholders of Medical Arts Building, Winnipeg, have voted in favour of a six storey extension to the present building. The extension will front on Kennedy Street and is necessary to provide office space for medical officers returning from overseas.

In memory of his father, a pioneer Manitoba physician, J. Laurie Lamont, M.B., Assistant Chief Medical Officer, Department of Veterans' Affairs, Winnipeg, has donated to the University of Manitoba the sum of $3,000, the proceeds of which are to be used to provide the Dr. T. J. Lamont Memorial Prize. The prize will be offered every alternate year for an essay or report on original work or investigation on maternal and neo-natal welfare. Competition is open to graduates in medicine of the University of Manitoba up to the end of the fifth graduate year. The winning essay will be published in a suitable Canadian medical journal. The donor hopes that the prize will not be regarded as a goal in itself but rather as stimulus to improvement in maternal and neo-natal welfare. ROSS MITCHELL

New Brunswick

The corner stone of the Sackville Memorial Hospital was laid by Capt. R. V. Bennett on July 4. Senator A. B. Copp was presiding officer of the ceremonies and Dr. F. A. McGrand, Provincial Minister of Health, was the chief speaker.

Lieut.-Col. J. A. Melanson, R.C.A.M.C., has returned home after a brilliant career in the services overseas. He is at present visiting at his home in New Brunswick.

The annual meeting of the New Brunswick Society of X-Ray Technicians was held in Moncton on June 23 and was largely attended. Miss Margaret Grant, R.T., of Saint John was elected president. Medical speakers included Dr. H. R. Ripley of Moncton who spoke on "Pelvimetry" and Dr. A. S. Kirkland of Saint John whose subject was "The cancer patient".

Capt. T. A. Laidlaw, R.C.A.M.C., of Sussex has recently been mentioned in despatches.

Dr. Geo. M. White of Saint John has been elected a councillor of the Society of Obstetricians and Gynæcologists of Canada.

Dr. R. J. Collins of Saint John Tuberculosis Hospital has been re-elected president of the Maritime Hospital Association at the annual meeting at Charlottetown.

Dr. H. P. Grant, Dean of Medicine, University of Dalhousie was a recent visitor to New Brunswick when he visited hospitals staffed by interns from Dalhousie.

Arrangements have been practically completed whereby the Town of Sussex and the County of Kings, N.B., will jointly finance a 30 bed hospital at Sussex.

Major A. F. Chaisson, R.C.A.M.C., has returned from overseas and is stationed at Debert Military Hospital.

A. STANLEY KIRKLAND

Nova Scotia

The many friends of Dr. Edwin Fraser Ross, Lieutenant-Colonel in the Royal Canadian Army Medical Corps, will be pleased to learn that he has been recently awarded the O.B.E.

The Halifax Rotary Club has reecntly made a grant of $2,000.00 to Dalhousie University, Department of Psychiatry, to provide a trained social worker in the Field of Juvenile Delinquency. Her work will chiefly be confined to the City of Halifax. This donation was

greatly appreciated and is a genuine contribution to the advancement of social welfare in the community.

The Rockefeller Foundation grant to the Department of Psychiatry of Dalhousie University has been renewed for another three years.

Dr. L. W. Fitzmaurice, Acting Chief Medical Officer in the Bahamas and son of W. R. Fitzmaurice, former Canadian National Railways Superintendent, Atlantic Division, and Mrs. Fitzmaurice, 18 Ivanhoe Street, Halifax, was awarded the O.B.E. in the King's Birthday Honours List.

Dr. H. G. Grant, Dean of the Faculty of Medicine, Dalhousie University, who met with a painful accident several weeks ago, is now able to be about again.

Dr. E. M. Curtis of Truro, who for the past year has been in the Radiological Department of the Royal Victoria Hospital, Montreal, has returned to Truro.

The Eastern Shore has become hospital conscious. Definite progress has been made towards establishing a hospital at Musquodoboit Harbor. A site has been donated and money raised. The prospects of a hospital in Sheet Harbor are also quite definite. Of late the people of Ship Harbor are exploring the possibilities of having a small hospital there. At the present time this locality is without a doctor.

Dr. C. S. Cavanagh, who practised at Wood's Harbor for some years, has moved in to Yarmouth. This leaves vacant a practise embracing in part the district between Pubnico and Barrington.

Dr. C. J. W. Beckwith, formerly District Medical Health Officer for Cape Breton Island, has assumed his duties as Superintendent of the City Tuberculosis Hospital, Halifax.

H. L. SCAMMELL

Ontario

A large delegation from Ontario attended the annual meeting of the Canadian Medical Association in Montreal, in June. The Past-President, Dr. J. Harris McPhedran sought recuperation in a long holiday in Go Home Bay. The Past-President of the Ontario Division, Dr. Torrington of Sudbury was taken sick on the closing day of the convention but was able to travel to his home. The trouble turned out to be pneumonia. Dr. Torrington's recovery has been complicated by a heart condition and he is still convalescing.

Dr. Charles Crang of Sudbury, was taken with an attack of acute appendicitis while attending the Canadian Medical Association meetings. An emergency operation was done and Dr. Crang spent an extra week in Montreal.

On July 10 the Board of Governors of St. Michael's Hospital, Toronto, gave a dinner in the Royal York Hotel in honour of Dr. Julian Loudon who is retiring as Chief of the Medical Services. Dr. Loudon has held his position for over twenty-five years. He is also retiring as Assistant Professor of Medicine, University of Toronto. A large gathering of hospital officials and members of the staff of the hospital attended.

The first Canadian Physicians' Camera Salon held an exhibition in Montreal during the week of the Canadian Medical Association convention. In the section of Coloured Slides Dr. Harvey Agnew won first prize and Dr. E. M. Trow of Toronto the third prize. In the photographic section Dr. G. B. White of Port Colborne won the first prize and Dr. W. K. Blair of Oshawa an honourable mention. Other exhibitors from Ontario were Drs. J. H. Duncan, Sault Ste. Marie; Perry Orr King, St. Thomas; E. G. Meyer, Toronto; McLay Miller, Aylmer; W. V. Watson, Toronto; F. R. Griffin, Toronto and R. G. Ives, Stayner. The success of this first exhibition ensures a continued interest in a fascinating hobby for busy doctors.

A number of medical officers have returned from duty overseas and will resume practice or be assigned to duty in military hospitals. The list up to July 1 contains the following names: Lieut.-Col. J. R. Green; Lieut.-Col. I. Sutton; Lieut.-Col. C. G. Gossage; Lieut.-Col. L. T. Barkley; Majors T. H. Roderick, R. Boyden, F. Railton; R. J. G. Hanna, T. J. Argue, J. L. Green, B. Vale, D. D. Healey, J. W. Davidson, B. H. Curry, C. H. Ainsley, K. R. Wightman, W. E. Glass, W. F. Mustard, J. F. Fletcher, S. L. Lowry, R. G. Will; Col. A. Doyle; Capts. C. Robertson, Clinton, T. C. Dunlop, R. Ballison, T. Statton, P. D. Lindsay, F. B. Clarke, W. Omen, W. L. C. McGill, A. F. Graham, R. G. Tolemy and J. Scheinert.

The Hon. R. P. Vivian, Minister of Health of Ontario, has been appointed to the Chair of Hygiene and Social Medicine in McGill University and will assume his new duties in September. Dr. Vivian has been a success in his administration of the Department of Health and his resignation removes one of the strong members of the Cabinet in Ontario. His colleagues in Ontario have every confidence that their good wishes for his success will be realized.

Dr. Vivian's practice in Port Hope has been taken over by Dr. Helen Holden who has been retired from duty in the Women's Division of the R.C.N.R.

In view of the heavy demands currently on city physicians, the Windsor Medical Service, Windsor, Ont., announced on June 9 that it would list each week names of doctors who would be available for extra calls on Wednesdays, Sundays and holidays.

M. H. V. CAMERON

Prince Edward Island

Attending the Annual Meeting of the Canadian Medical Association, June 11 to 15, Montreal, were: Dr. J. C. MacNeill, Summerside, member of the executive; Dr. F. A. Farmer, Mt. Stewart, President of the Prince Edward Island Division of the Canadian Medical Association; Dr. A. J. Murchison, Secretary; and Dr. J. W. MacKenzie, Provincial Delegate. Dr. MacKenzie presented a paper entitled "Pancreatic cysts with report of a case".

The Hon. Dr. W. J. P. MacMillan, O.B.E., has recently been reappointed by the City Council of Charlottetown to the City School Board; Dr. MacMillan has served on this Board for many years.

On June 11, 1945, at the Prince Edward Island Hospital, Charlottetown, to Dr. and Mrs. O. H. Curtis, Bonshaw, a daughter Miriam Elaine.

The Hon. Dr. Cyrus MacMillan, following the federal election, returned to Montreal. However he will shortly return to spend the summer months at Bay Fortune, where he recently purchased a summer cottage.

It is with regret that the many friends of Dr. T. V. Grant, Montague, have heard of his illness, following closely upon his re-election to the Federal Parliament.

Dr. Leo McKenna, formerly of Charlottetown, was visiting here recently, following his return to Canada after five years with the Canadian Forces Overseas. Dr. McKenna is returning to London, Ont., where he was practicing prior to his enlistment.

Dr. S. J. Wherrett, executive secretary of the Canadian Tuberculosis Association, and Dr. Cameron St. Clair Guild, executive secretary of the American Trudeau Society of New York are in Charlottetown for the pur-

pose of studying the results of the tuberculosis survey now being made in the Province.

Major John Andrew, R.C.A.M.C., Charlottetown, has arrived home from overseas; following the termination of his leave he will return to Halifax, where he will be attached to Military District No. 6.

Major Andrew went overseas with the 1st Canadian Division in December, 1939, and has served in various theatres of war. He was the Medical Officer with the famous invasion troops who landed on Spitzburgen Island. In 1942 he had the command of a field ambulance with the 2nd Canadian Division. In October, 1942, he went to Italy with the 1st Canadian Corps; the ship he sailed on, the *Santa Elena*, was sunk by enemy aerial action. Before leaving Italy Major Andrew was in command of No. 3 Canadian General Hospital. In March, 1945, this unit moved to Naples, then to Marseilles, then overland to Holland. After V-E day he spent some time supervising surgical cases in German hospitals. Major Andrew has two brothers in the armed services, Colonel Fred Andrew, Officer Commanding Military District Depot No. 6, Halifax, and Major Wallace Andrew, who went overseas in 1940 and has returned to Canada recently. A. J. MURCHISON

Quebec

Les Journées Médicales Annuelles organisées par la Société Médicale de Montréal auront lieu les 1ier, 2, 3, et 4 octobre sous la présidence due Dr Paul Letondal. On y présentera des travaux d'ensemble sur les nouveautés cliniques et thérapeutiques en divers domaines de la médecine et de la chirurgie.

Le Dr Oscar Garant succède au regretté Pr. Joseph Caouette à la direction du service de gynécologie de l'Hôtel-Dieu de Québec.

Le Conseil médical récemment élu à l'Hôpital Notre-Dame de Montréal comporte les noms suivants: Dr R. Amyot, président; Dr A. Bertrand, vice-président; Dr R. Dufresne, secrétaire; Drs A. Marin, L. Gérin-Lajoie, A. deGuise, J. U. Gariépy et P. Bourgeois, membres du comité exécutif.

La Société de Chirurgie de Montréal a élu à sa séance du 21 avril dernier le Dr Albert Couturier comme président, et le Dr Antonio Samson comme secrétaire.

L'Université de Montréal a conféré, le 25 mai dernier, un doctorat en médecine *Honoris causa* au Dr W. Penfield, directeur du M.N.I. et au Dr J. E. Desrochers, président du C.M.&C. de la province.

La Société médicale de Valleyfield a organisé le 7 juin dernier une Journée Scientifique Médicale avec présentation de travaux par des médecins locaux et invités.

La Société Médicale de Québec a reçu le 16 mai dernier le Dr Pierre Smith de Montréal. Celui-ci parla du lever précoce en chirurgie abdominale.

JEAN SAUCIER

The establishment of refresher courses at the Jewish General Hospital for returned medical officers, under the supervision of McGill University's Faculty of Medicine, is announced by Allan Bronfman, president of the Jewish General Hospital. Mr. Bronfman spoke at the 11th annual meeting of the hospital's board of governors.

"We have been asked to co-operate with McGill University in a rehabilitation program by establishing refresher courses for returned medical officers. These courses will be conducted at this hospital. Following discussions with the university authorities further participation of our hospital in the teaching activities of the Medical Faculty of McGill University is now under consideration for a comprehensive program of graduate study and teaching in the clinical department of the Faculty of Medicine," he said.

For the last four years the obstetrical department of the Jewish General Hospital had not lost a mother, it was revealed. During 1944, 1,010 babies were born there.

Patients admitted last year totalled 4,969, of which 4,173 were Hebrew; 287 Protestant; and 451 Roman Catholic. The hospital ambulance made 498 trips and a total of 402,826 meals were served during the year.

General

National Immunization Week.—National Immunization Week is being held this year from September 30 to October 6, under the sponsorship of the Health League of Canada. The necessity for drawing attention to this is still present. Diphtheria in 1944 showed an actual increase in number of cases as compared with 1943 (3,211 as against 2,804), with a mortality for the first nine months of last year of 168. Whooping cough for 1944 showed in the same period of 1944 a mortality of 209. These are figures which should be borne in mind in case there is any complacency regarding reduction in mortality as compared with former years.

Toxoid now gives a harmless but effective protection against diphtheria. Whooping cough vaccine is less effective, but still is a very valuable protection, both in actual prevention and in mitigating the course of the disease.

Scarlet fever is still a serious and common disease. In 1944 there were 20,945 cases as against 18,639 in 1943, with 100 deaths in 1943 and 83 in the first nine months of 1944. Here again the toxin is a valuable aid in protection.

Smallpox has practically become extinct in Canada, but the precautionary necessity for vaccination is as strong as ever it was.

There is an enormous potential and actual value in the efforts being made in this Immunization Week, and they should receive the fullest support of our profession.

Postgraduate Course at Queen's University.—The Autumn Postgraduate Course, Queen's University Medical Faculty, will be held in Queen's University, Kingston General Hospital and the Hotel Dieu Hospital on November 7 to November 10 inclusive. The afternoon meeting, dinner, and evening meeting on November 7 will be combined with the annual meeting of District No. 7, Ontario Medical Association. As in the 1944 Autumn Postgraduate Course, there will be this year, bedside clinics, lectures, discussion groups, and, on the occasions when lunch or dinner is arranged by the Postgraduate Committee, guest speakers. Last year the members of the course visited one of the large industrial plants in the district. This year it is hoped that the members of the course will again have the pleasure of such a visit and, also, be kindly permitted to see the new Department of Veterans' Affairs Hospital in Kingston.

Members of the profession in the Services are cordially invited to attend the course without payment of registration fee.

"Sulfa" in Wounds Discontinued.—The U.S. Army's accumulated experience in wound management does not justify the local use of any chemical agent in a wound as an anti-bacterial agent, according to the Office of the Surgeon-General. The local use of crystalline sulfonamides (sulfa powder) has therefore been discontinued except in the case of serous cavities where its use, while permissible under the direction of the surgeon, is not recommended. This subject is covered by War Department Circular No. 160 as amended by W.D. Circular No. 176, 1945.

The Eye-Bank for Sight Restoration Inc.—The Eye-Bank has been established in New York in order to

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make available to hospitals and surgeons who are qualified to perform the corneal graft operation a supply of fresh or preserved corneal tissue, wherever and whenever needed.

Initially, the needed space and personnel has been made available in the Manhattan Eye, Ear and Throat Hospital. The Eye-Bank will acquire additional space, personnel and equipment as needed, so as to serve not only the New York area but localities throughout the country.

American Congress of Physical Medicine.—The annual scientific and clinical session for 1945 of the American Congress of Physical Medicine has been cancelled. This meeting was to have been held in New York City, September 5 to 8, 1945.

The Alvarenga Prize.—In recognition of his important work upon the various types of Rh factors and on their genetic transmission, the College of Physicians of Philadelphia is awarding on July 14, 1945, the Alvarenga Prize for this year to Alexander S. Wiener. Dr. Wiener will give the Alvarenga Lecture before the College of Physicians of Philadelphia and the Philadelphia County Medical Society on October 3, 1945, on "Rh Blood Factors in Clinical Medicine".

Book Reviews

The Treatment of Peptic Ulcer. G. J. Heuer. 118 pp. $4.00. J. B. Lippincott, Montreal, 1944.

This book covers all the details in the treatment of peptic ulcer as well as affording an accurate record of the results obtained in the various forms of treatment in a large series of patients.

The author, when dealing with the surgical aspect in the treatment of peptic ulcer, tries to give guidance as to the most suitable type of operation for each case. In these times, when it would appear that all surgeons are advocating more and more extensive resections of the stomach, it is encouraging to note that simple gastroenterectomy with its lower postoperative mortality rate is given creditable mention.

The statistics as quoted in the conservative or medical management of peptic ulcer are rather discouraging and might be misleading, but it is repeated on more than one occasion that the series reported on comprise ward patients who were ill enough to be admitted to a hospital. No doubt many of these had not the intelligence to follow a proper medical regimen or the where-with-all to provide proper food.

The follow-up on all cases reported was very thorough and is still being carried out, so that at some future date more information may be given to the profession.

The fact that the book is small and that all data and information are given in a clear and concise manner makes it a very satisfactory reference book and also brings to the profession the seriousness of the disease.

Practical Anæsthetics, for Students, Hospital Residents and practitioners. J. R. Mackenzie, Lecturer on Anæsthetics, University of Aberdeen. 136 pp., illust. $3.00. Baillière, Tindall and Cox, London; Macmillan, Toronto, 1944.

This book contains twenty chapters dealing with preparation of patient, premedication, inhalation anæsthesia and inhalation agents, endotracheal, intravenous, local and regional anæsthesia, obstetrical analgesia and anæsthesia, and oxygen therapy.

There are some valuable pointers for the untrained anæsthetist who is obliged to administer anæsthetics. It fulfils the object of the author when he states that the book is "practical anæsthetics" for students, hospital residents and practitioners. There is very little additional information for the specialist in anæsthesia.

Arthritis and Allied Conditions. B. I. Comroe, Associate in Medicine, University of Pennsylvania. 3rd ed., 1359 pp., illust. $13.75. Lea & Febiger, Philadelphia; Macmillan, Toronto, 1944.

This book is highly recommended as a complete, conservative survey of a large and difficult field of medicine. Its arrangement is such as to make it a valuable reference text, each chapter being complete in itself. Frequent summaries, placed in box form throughout the book, are of value in focussing attention upon salient points and were designed for rapid reference.

Revision over the previous edition is very extensive and brings the subject matter thoroughly up-to-date, even to an unusually comprehensive chapter on penicillin. It is noteworthy that in the many necessary digressions into related medical subjects the same conservative and thoroughly modern approach is maintained.

Clinics. Vol. III, No. 3. Edited by G. M. Piersol. 300 pp., illust. $3.00. Lippincott, Montreal, 1944.

The uniform standard of this well-known quarterly publication is maintained by the present volume which presents a symposium of 14 articles dealing with gastrointestinal disorders. Two additional articles, one on Thiouracil in Thyrotoxicosis, the other concerning Oculomotor Paralysis, round out the volume. Among the contributors are several of international repute. Babkin and associates recount experimental evidence to show that the vagi and the pyloric hormone are able to work separately in the production of gastric juice. Alvarez discusses a syndrome of pain associated with the act of defæcation in certain neurotic individuals; Bargen and Sauer the influence of chronic ulcerative colitis in the causation of carcinoma (based on 30 cases seen at the Mayo Clinic since 1935); and Rehfuss outlines the importance of a life-long therapeutic program in the treatment of peptic ulcer (control of diet, abstinence from tobacco and alcohol and avoidance of emotional tension). E. D. Kiefer covers the subject of Regional Enteritis and reviews a series of 107 cases from the Lahey Clinic, he stresses the need of always considering this diagnosis in the presence of diarrhœa, which accompanies two-thirds of cases. He also urges hourly roentgenograms for 6 hours after ingestion of barium whenever disease of the small bowel is suspected.

Catarrhal Jaundice is reviewed by H. J. Tumen and Primary Carcinoma of the Liver by J. E. Berk. The medical management of the complications of peptic ulcer is handled in a refreshingly conservative fashion by Russell S. Boles, particularly in regard to the sane approach to the problem of gross ulcer hæmorrhage, where he advocates a rational balance between nutritional needs and digestive ability.

Shoulder Lesions. H. F. Moseley, Lecturer in Surgery, McGill University, Montreal. 181 pp., illust. $6.00. Thomas, Springfield, Ill.; Ryerson Press, Toronto, 1945.

A new volume on "the shoulder" must prove exciting to every one who has examined this region of many ails, and fumbled for a diagnosis. In his opening chapter on the mechanism of the shoulder the author succeeds in interpreting the detailed anatomy of the dissecting room in terms of life and function. The reader is able to visualize the whole rhythm of the shoulder musculature as it goes through its work-a-day movements. After spending a chapter on examination of the region the author goes on to consider the specific lesions, their etiology, pathology, diagnosis and treatment. The supraspinatus, infraspinatus, teres minor and subscapularis, he considers as a "rotator cuff" and the rupture of their tendons, as a clinical entity, is made to stand out with

clarity. Subluxations and dislocations, calcified deposits in the musculature, periarthritis and allied conditions are dealt with in succeeding chapters. Operative procedures are presented briefly and there is an excellent chapter on re-education of shoulder function.

The author refers frequently to the earlier work of Codman and others in this field, but he does not hesitate to present the conclusions of his own wide clinical experience. He makes great use of the novocaine injection, both in diagnosis and therapeusis.

Out of the vague diagnostic and pathological mist which has shrouded lesions of the muscles, tendons and joints, clinical forms are, in recent years, beginning to appear. Toward ultimate clarity Dr. Moseley has made a very real contribution.

Internal Medicine, its Theory and Practice. Edited by J. H. Musser, Professor of Medicine in the Tulane University of Louisiana School of Medicine. 4th ed., 1518 pp., illust. $11.50. Lea and Febiger, Philadelphia; Macmillan, Toronto, 1945.

As readers of previous editions will recall, this textbook is the work of thirty-three contributors, all leaders in their respective fields in various hospitals throughout the United States. Some old names have disappeared from the list of authors and a few new ones have been added. Since the last edition appeared, the advances in internal medicine have been great: the sulfonamides, penicillin and thiouracil, to mention a few. A discussion of these new therapeutic agents, together with consideration of military neurosychiatric disabilities and altitude sickness, has added about two hundred pages to this edition, but has brought the subject matter strictly up to date.

Without exception the various sections are well written and well arranged. The diagrams, pictures and x-rays are well reproduced, but one might wish there were more of them.

The whole subject of diagnosis is adequately covered even in those diseases of the alimentary and urinary tracts which are generally accepted as being the province of the surgeon. Worthy of note is the exceptionally clear exposition of our present knowledge of the gonadotropic hormones by Fuller Albright.

This volume can be recommended as an up-to-date text for the medical student and as an excellent reference for the practitioner.

Galen on Medical Experience. First edition of the Arabic version with English translation and notes by R. Walzer. 164 pp. $3.75. Oxford University Press, Toronto, 1944.

This is a publication of peculiar interest. It restores to the medical world one of the earliest of Galen's works, the original text of which has been lost. A ninth century manuscript of the Arabic translation of the work was discovered in a Constantinople library in 1931 by Dr. H. Ritter, and the Arabic text is here reproduced with the English translation by Dr. Walzer of Oriel College, Oxford. Oxford University Press has published the work for the trustees of the late Sir Henry Wellcome at an extremely reasonable price and has made a handsome job of printing and format.

In addition to making available one of the lost treatises of Galen, there are as one would expect other significant values in this book. It adds greatly to our knowledge of the ancient Empirical school of medicine, of the famous Esclepiades, and of Galen's own medical gospel which was that of the "practical" man, uniting empiricism and theory. It contains matters of philosophical importance bearing on the views of the Sceptic philosophers and gives a new fragment of Democritus, as well as a discussion of the origin and eternity of the world.

The treatise is in the familiar form of the Greek writers of the time. A personal introductory section by Galen is followed by a disputation between representatives of the Dogmatist and the Empirical schools of medicine. Matters of medical practice and even practical therapeutic subjects are entangled in a mesh of philosophical and theological considerations—a medley which appears bizarre to modern medical eyes and shows again how difficult it must have been finally to disassociate medical science from the binding-chains of abstract philosophy.

Notwithstanding all this, the treatise makes interesting reading. The student will learn infinitely more of the mind and figure of Galen, the ancient dictator of medicine, from reading him in these pages than he will in conning the opinions of medical historians. He comes to life here as an energetic, industrious fellow, revelling in controversy, a facile man of the world, and a plausible fluent writer.

This is a book which will delight students of medical history, and it should be equally enjoyed by those interested in philosophy and in the late Greek writers. Finally it provides an easy passport to the mind of Galen.

Control of Pain in Childbirth. C. B. Lull, Clinical Professor of Obstetrics, Jefferson Medical College and R. A. Hingson, Surgeon, U.S. Public Health Service. 356 pp., illust. $9.50. Lippincott, Monreal, 1944.

Here at last has been gathered into book form a comprehensive statement on the control of pain during labour, and it is a masterly and extraordinarily well documented volume. Every form of pain-relief, excepting only hypnosis, is described and discussed, together with methods of administration and results on mother and child, and the case for and against each stated. Full page illustrations, beautifully designed, show at a glance the effects of the various agents on the vital organs of mother and child. Some of the coloured plates are works of medical art.

While the bulk of the book is given up to the control of pain in normal labour, there is an excellent section on the choice of relief in obstetrical complications and Cæsarean section. The use of local anæsthesia is fully described. There is a short chapter on relief of pain in domiciliary obstetrics, and a very sane one on resuscitation of the newborn.

As the popularizers of caudal anæsthesia in labour the authors naturally have a decided bias in its favour, and the sections dealing with it are complete with the details of anatomy, technique, contraindications and dangers. Anyone who has used this method will agree with all they say about its safety as touching the baby. With regard to the mother, however, the picture is not quite so happy. They report 12 maternal deaths in 30,000 cases, or one in 2,500, which is a high anæsthetic deathrate. To some extent the future of this method will depend on whether or not improvement of technique and choice of patient, can lower this rate.

This is a book that should be read by everyone practising obstetrics.

Atlas of the Blood in Children. K. D. Blackfan, late Thomas Morgan Rotch Professor of Pædiatrics, Harvard Medical School, and L. K. Diamond. 320 pp., illust. $12.00. Commonwealth Fund, New York, 1944.

This atlas of blood dyscrasias in children consists of five chapters with 70 illustrations in colour, bibliography, and index. The first chapter is a brief review of the origin of the blood cells; the second of the changes which occur in the red blood cells in the various anæmias. The third chapter deals with the leukocytes in disease; the fourth is devoted to leukæmia. The final chapter concerns the disturbances of platelets. The coloured plates are excellent, particularly those illustrating the various types of leukæmia. Both the text and the bibliography are brief, and include only the more important contributions to the subject. The value of the book consists largely in the excellent coloured photographs which accompany the text. The material is based upon a study of the blood changes in infants and children at the Infants' and Children's Hospital in Boston.